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TECHNICIAN EDUCATION YEARBOOK, 1965-1966.

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THE SCOPE OF THE FIRST EDITION OF THE TECHNICIAN EDUCATION YEARBOOK (VT 003 546) WAS BROADENED IN THE SECOND EDITION TO INCLUDE THE AGRICULTURAL, BUSINESS-RELATED, CIVIL, ELECTRICAL-ELECTRONIC, HEALTH, INDUSTRIAL, AND MECHANICAL TECHNOLOGIES. THE PURPOSE IS TO PROVIDE A SINGLE SOURCE DOCUMENT CONTAINING INFORMATION ABOUT THE TECHNICIAN EDUCATION FIELD FOR THOSE PEOPLE NOW OFFERING OR PLANNING TO OFFER SUCH TRAINING AND FOR GUIDANCE PERSONNEL SO THAT THEY CAN INTELLIGENTLY COUNSEL YOUNG MEN AND WOMEN WHO ARE PLANNING CAREERS AS TECHNICIANS. MAJOR SECTIONS INCLUDE--(1) A NATIONWIDE DIRECTORY OF 865 INSTITUTIONS OFFERING TECHNICIAN TRAINING WHICH LISTS UNDER EACH STATE THE NAME OF THE SCHOOL, THE TOTAL AND TECHNICIAN ENROLLMENTS, ACCREDITATION, ADMISSION REQUIREMENTS, AND PROGRAMS OFFERED, (2) A DIRECTORY OF FEDERAL AND STATE OFFICIALS RESPONSIBLE FOR TECHNICIAN EDUCATION, (3) INFORMATION ON THE PROFESSIONAL ORGANIZATIONS CONCERNED WITH TECHNICIAN EDUCATION, (4) OCCUPATIONAL INFORMATION FOR ENGINEERING SCIENCE, MEDICAL X-RAY, AND DENTAL LABORATORY TECHNICIANS, (5) GENERAL TRENDS IN TECHNICIAN ENROLLMENTS, PLACEMENT, AND SALARIES, (6) INFORMATION ON FEDERAL LEGISLATIVE DEVELOPMENTS AND AID TO TECHNICIAN TRAINING FROM THE HIGHER EDUCATION FACILITIES ACT OF 1963, (7) ISSUES, PROBLEMS, AND PROPOSALS OF TECHNICIAN TRAINING, AND (8) CASE STUDIES OF TECHNICIAN TRAINING PROGRAMS. A BIBLIOGRAPHY IS INCLUDED. THIS DOCUMENT IS AVAILABLE FOR $10.00 FROM PRAKKEN PUBLICATIONS, INC. 416 LONGSHORE DRIVE, ANN ARBOR, MICHIGAN 48107. (HC)

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1965-1966

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Yearbook

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1965-1966

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Foreword

EDUCATORS, concerned about the fact that they had to search—often fruitlessly—for information they wanted about technician training, literally asked that a TECHNICIAN EDUCATION YEARBOOK be published. With the recent, rapid growth in technician training, the increased public awareness of the importance of such training, and the availability of federal funds for such training, the need for a single source book containing information about this field became vital, so the first edition was issued in 1963, designed to fill that need. The response to that edition from those in the field was most gratifying.

This second edition will, we hope, prove to be even more valuable to those involved in technician education. We have enlarged the scope of the book. The first edition was limited to the industrial technician field, that is, to those trained technical workers who assist engineers and scientists or do other technical work in industry. In the present volume the concept has been broadened and now includes the agriculture technologies, the business-related technologies, civil technologies, electrical-electronic technologies, health technologies, industrial technologies, and mechanical technologies.

Once again, an important feature of the YEARBOOK is the nationwide directory of schools offering technician training. The value of the directory in the first edition was emphasized, again and again, in communications from those in the field.

The directory in this edition is much more complete and comprehensive. More than 1250 questionnaires were sent out to schools that were said to offer technician training. Information for the directory was obtained largely from the replies to these questionnaires, augmented by information from the U.S. Office of Education, Division of Vocational and Technical Education, from members of state departments of education throughout the country, and from leaders in the field.

The growth of technician education in this country in just the past two years can be realized when the number of listings in the directory in this issue and that in the first edition (1963-1964) are compared. The first directory listed 701 schools offering technician education. The current directory lists a total of 865 institutions offering technician education. Granted, there were some schools inadvertently omitted from the first list, due to lack of information; but even taking into consideration these few omissions, the growth in two years is impressive.

Again, it is with pride that we present this second TECHNICIAN EDUCATION YEARBOOK. It contains, in addition to the only nationwide directory of schools, a directory of federal and state officials of technician education, recent federal legislative developments, occupational information about technicians, additional case studies of some excellent programs now in operation, and a series of articles on issues, problems, and proposals concerning technician education.

Our purpose in this second edition remains the same: to be helpful to those people now offering technician training, to those planning to offer it in the near future, and to guidance personnel so they can intelligently counsel young men and women who are planning careers as technicians.

—The Editors

Acknowledgments

FOR their cooperation, their help, and their encouragement in obtaining and preparing the material for this 1965-66 edition of TECHNICIAN EDUCATION YEARBOOK, we wish to give special recognition to the following persons and organizations:

Staff members of the Division of Vocational and Technical Education, U.S. Office of Education, Washington, D.C., and especially Walter J. Brooking, Alexander C. Ducat, and Robert M. Knoebel, Technical Education Specialists in the Division.

Staff members of the U.S. Department of Labor, Bureau of Labor Statistics, Washington, D.C.

Officials of the various state departments of education.

The various professional organizations in the field.

The many individuals, institutions, and companies serving the field of technician education.

And a blanket acknowledgment of thanks to all others who cooperated with us in getting the information for this book.

Contents

FOREWORD v

ACKNOWLEDGMENTS vii

SECTION 1 1

The Federal Government's Role in the Training of Technicians
Walter M. Arnold

SECTION 2 9

Directory of Institutions Offering Technician Training 11
Directory of Federal and State Officials of Technician Education 67

SECTION 3 71

Federal Legislative Developments
Theodor Schuchat

SECTION 4 77

Occupational Information about Technicians 79
Salaries of Employed Engineering Technicians
Theodor Schuchat 90

SECTION 5 93

Technician Education Programs, Enrolments, and Salaries of Graduates

SECTION 6 103

Aid to Technician-Training Institutions from Higher Education Facilities Act of 1963

SECTION 7 109

Case Studies of Programs in Schools

Training Radiation Technologists at Oklahoma State University Technical Institute
Donald W. Brown 111

Training Agricultural Technicians at Modesto Junior College
Walter M. Garcia and Ernest A. Tarone 114

The Erie County Technical Institute Program in Dental Hygiene
Albert E. Roberts 120

Training Fluid-Power Technicians at Milwaukee School of Engineering
Russell W. Henke 124

Setting Up an Optical Technology Program
Robert E. Bergstrom 129

Training Diesel Technicians at Williamsport Area Community College
Donald M. Flynn 134

Training Environmental Sanitation Assistants at Ferris State College
David H. McMullen and Richard D. Hunter 138

SECTION 8 143

Issues, Problems, and Proposals

Training for Engineering Technicians
A. C. Bodeau 145

Technical Education for the Graphic-Arts Industry
Samuel M. Burt 150

Guidelines for Establishing Technician Programs
Richard Lyons Burns 156

Technical and Vocational Education within the Community College: The Problems and How to Solve Them
Maurice F. Seay 160

New Developments in Technician and Vocational Education in Canada
C. Ross Ford 164

Occupational Analysis for Technical Education
Maurice W. Roney 169

SECTION 9 173

Professional Organizations Concerned with Technician Education

The American Association of Junior Colleges 175

National Council of Technical Schools 177

American Technical Education Association, Inc. 178

Engineers' Council for Professional Development 181

Institute for the Certification of Engineering Technicians 185

Technical Institute Council and Technical Institute Division, American Society for Engineering Education 186

SECTION 10 189

Bibliography

Section 1

The Federal Government and Technician Education

The Federal Government's Role in the Training of Technicians

By Walter M. Arnold

Director, Division of Vocational
and Technical Education,
U.S. Office of Education,
Washington, D.C.

THE role of the federal government in educating highly skilled technicians is to promote and assist in the establishment of high quality programs in all of the states, wherever there is a labor force need for trained personnel or where there are persons who can profit from such specialized occupational education.

Technicians are persons who have the scientific knowledge and competencies in some recognized branch of science to support the work of professional scientists or engineers. They are usually educated in rigorous two-year post-secondary education programs designed to provide them with knowledge, skills, and attitudes required to enable them to perform as highly skilled technicians.

There are many kinds of technicians, just as there are many kinds of professional scientists. Many are employed in the physical sciences and related engineering fields. Examples are chemical, metallurgical, mechanical design or production, civil, electrical and electronics, and architectural technicians. Many others are skilled in the applied life sciences—particularly in the medical field and in the broad spectrums of agricultural research, processing, and utilization.

Examples of life-science technicians are medical laboratory, dental hygiene, dental laboratory, radiological, agronomy, horticultural, food processing, oceanographic, animal science, soil science, agricultural-production equipment, and forestry or specialized plant-science technicians. Some combine life-science and physical-science disciplines—such as sanitation, pharmaceutical, or special clinical- or hospital-equipment technicians.

The objective of preparatory programs for educating technicians is to provide a broadly based competency in the field of sufficient depth that the graduate technician may be employed in one of a cluster of related work opportunities in his field. On employment, a brief period of orientation to his particular duties in the employer's organization, together with continued on-the-job study, permit him to advance rapidly to high levels of productivity and increased responsibility.

Basic Understandings Needed

Education programs to prepare technicians for their work as assistants to scientists must provide them with an understanding of the basic principles of their field of science, and of the related science and mathematics which support their main field. They must also absorb a comprehensive knowledge of the procedures, materials, devices, techniques, equipment, and processes used in that scientific field and learn facility in the use of them. They must develop the ability to communicate with the professional scientists or engineers with and for whom they work. The technician must learn to employ the mode of thinking and intellectual discipline embodied in the scientific method, the ability to seek and find pertinent information, and the capability to work with both the scientist and the skilled workman or other aides to accomplish a variety of work assignments.

Programs for educating technicians are characterized by intensive classroom and laboratory learning. About 50 percent of the curriculum is the study of science in classroom and laboratory work. A planned sequence of courses emphasizes scientific principles and provides practice with procedures, processes, materials, apparatus, equipment, and skills as they are currently used.

Mathematics, as required, is taught early in the technical program to obtain maximum utilization of its support of the study of the applied science. Communication skills and reporting are taught and practiced; and an elementary study of economics, organizations, and human relations provide a frame of reference to the student technician as a member of society and as an employe of a working organization.

Several types of schools offer technical and related vocational education. Of these, the greatest growth has been in junior colleges, community colleges, technical institutes, and area vocational and technical schools. Technical and comprehensive high schools also offer such programs; and their orientation toward the needs of technical and related vocational education is of great importance since they prepare students to enter technical-education programs either in high school or on graduation from high school.

NDEA Sparked Local Interest

The need for educating highly skilled technicians was first recognized and implemented by federal legislation with the passage of Title VIII of the National Defense Education Act of 1958. Under this Act the U.S. Office of Education was directed by Congress to administer grants of funds to the states, to be matched by the states dollar for dollar, to train highly skilled technicians "necessary for national defense."

A heading was inserted into the Act which read: "Area Vocational-Education Programs." The language below that heading amended the Vocational Education Act of 1946 (which we know as the George-Barden Act) to add a new title (Title III) which authorizes ". . . grants to states to assist them in training individuals for employment as highly skilled technicians in occupations requiring scientific knowledge in fields necessary for the national defense."

The Act provided federal funds beginning with $3.75 million in 1959 and growing to $15 million in 1963 and 1964 for the purchase of laboratory equipment, for teacher salaries, and for providing materials and other services for programs for technical education.

There were several reasons for the enactment by Congress of Title VIII of the NDEA.

First of all, the highly skilled technician was becoming an increasingly essential part of the scientific and management team in modern scientific research, development, production, and services. The team is composed of professional scientists, engineers, specially trained technicians, supervisors, and skilled production or laboratory workers.

A second reason: Technicians are in short supply. The ratio of technicians to scientists or engineers at present is usually less than one to one, but there is need for two or more technicians to support each engineer or professional scientist. For many years the number of new technicians formally prepared to work with physical scientists and engineers had been limited to about 16,000 graduates of a relatively few publicly supported institutions and a number of private, nonprofit technical institutes. Studies of the physical sciences and related engineering fields indicate a need for at least 100,000 new technicians each year. These figures show that a considerable effort to educate more technicians is needed to meet the nation's need for accelerated research, development, and productive effort.

A third factor contributed to the passage of Title VIII. The explosion of scientific knowledge was creating changes in scientific education so that the professional scientist or engineer received little laboratory experience. He functioned more as a theoretical scientist than he had in the past. Thus, a vacuum was developing in the area of applied laboratory knowledge which had to be filled by highly skilled technicians.

Since the passage of NDEA, enrolment of full-time students in technical-education programs, most of them post-high school, grew from fewer than

20,000 in 1958 to more than 90,000 in 1964. In 1958, some 260 schools provided education of this type for highly skilled technicians under Title VIII, and the number had grown to nearly 800 by 1964. Many of the new schools have been built primarily to train technicians and other skilled personnel.

Federal funds expended for technical-education programs from the beginning of the program in 1959 through fiscal year 1964 total $54,704,605. Added to this figure are the states' matching contributions of $30,162,487 and local expenditures of $46,429,204, making a grand total of $131,296,296.

In fiscal year 1964, a total of 221,241 students were enrolled in 881 institutions offering technical training. This is an increase of 236 percent since the inception of the program.

The largest number of enrolments is found in extension courses especially designed to upgrade the skills of employed adult technical workers. More than 128,000 persons took advantage of such courses in fiscal year 1964.

Some 72,000 student technicians were enrolled in two-year post-secondary programs and more than 20,000 in secondary programs during fiscal year 1964.

Graduates Prove Program Effectiveness

The 16,000 or so technicians who have been graduated each year for the past decade are the product of about 60 to 70 private, nonprofit, or proprietary technical institutes, and public, state, or locally supported technical institutes. A few are divisions of four-year colleges or universities. Some of these institutions are expanding their programs, particularly the public technical institutes in New York State which have been in operation for 20 to 40 years.

The excellence of the programs in these established and successful institutions provides a reservoir of experience and success which proves the practicability of establishing programs to educate technicians. These programs provide examples of what good technicians are, and also provide patterns for establishing and advertising good technical-education programs.

The leadership of the group of educators in these institutions has been a major element in establishing high quality standards for such programs. They have become an active division of the American Society for Engineering Education. In 1962, the Society published the results of a comprehensive nationwide study of technical institute education entitled *Characteristics of Excellence in Engineering Technology Education,* a major contribution to the literature in the field.

The Engineers' Council for Professional Development, which accredits professional engineering education, also accredits technical-education programs within engineering-related technologies. In 1964 there were 127 accredited curriculums in this field in 33 institutions throughout the United States.

Funds Provided

In recognition of the growing importance of this type of education, Congress, in the Vocational Education Act of 1963, made permanent the provisions of Title VIII of the National Defense Education Act for training highly skilled technicians. The new Vocational Act also provides substantially increased funds to meet the vocational- and technical-education needs of greater numbers of people of all ages in all communities.

Funds under the Act of 1963 may be used for construction of facilities, as well as for teacher salaries, libraries, laboratories and equipment, and needed materials and services for educating technicians. The 1963 Act requires a dollar-for-dollar matching of federal funds with state and/or local funds. Technicians of all kinds may be educated—both those in the physical sciences and related engineering fields, and those in the life sciences, especially those needed for the medical and health fields and for agricultural occupations.

Research funds for vocational and technical education were, for the first time, authorized by the Congress in the Vocational Education Act of 1963. Ten percent of all funds appropriated under the Act are designated to be used for research, demonstration, and experimental projects in the field. The funds are substantial: $11.85 million in fiscal year 1965, $17.75 million in 1966, and $22.5 million for every year thereafter. These funds are used for grants by the U. S. Commissioner to colleges and universities, and other public or nonprofit private agencies and institutions, to state boards, and, with the approval of the appropriate state board, to local educational agencies, to pay part of the cost of research and training programs and of experimental, developmental, or pilot programs developed by such institutions, boards, or agencies, and designed to meet the special vocational-education needs of youths, particularly those with academic, socioeconomic, or other handicaps. Thus, the value to be gained from organized research now is directed by the Congress to be used to improve vocational-technical education.

How Research Can Help

Among the key ways in which the new research and planning program in vocational education can be of great assistance to technical training are these:

It can help define some of the emerging technologies, identify probable future ones, and make meaningful estimates of the number of technicians needed in such fields.

It can help develop better and more efficient ways to prepare technicians through advances in methods of teacher training, ways to provide more pertinent laboratory experience, better use of visual and audio teaching aids, and the development and perfection of the applied use of programed-learning techniques.

It can help to develop more useful curriculum and other instructional materials.

It can help plan and design facilities for the teaching of technicians.

In addition, the research programs now being federally supported in the occupational field should be of special benefit in setting up pilot and demonstration projects in training for the new technologies. We certainly hope that the occupational-research program will achieve a breakthrough in the badly needed new methods and programs for the education of teachers of technicians.

Funds may also be used under Section 4(c) of the Vocational Education Act of 1963 (the research section) to provide for teacher institutes as a means of preparing or upgrading teachers in these special fields.

An excellent example of what can be done with such institutes is provided by an experience of two years ago when a critical shortage of teachers of electronic data processing was identified by the U.S. Office of Education in states from one coast to the other. As a result, cooperation was obtained from five state boards and five institutions to set up special teacher institutes during the summer of 1963.

From these institutes came about 100 teachers of computer programing and business application analysis, easing a demand so heavy that state and local educators throughout the country had decided to abandon any idea of waiting for the usual teacher-education programs to produce these specialized instructors.

New Funds Available for Facilities

In addition to the acts discussed above, Congress enacted the Higher Education Facilities Act of 1963, authorizing $1.2 billion for construction of facilities for public and nonprofit private colleges. Of these funds, 22 percent are earmarked for construction of facilities for public community colleges and public technical institutes which meet the requirements specified by the Act. These latter institutions are eligible for federal funds in the amount of 40 percent of their improvements for the stated purposes—while other institutions qualifying under Title I of the Act are entitled to federal shares of up to one-third. This clearly indicates the importance attached by the Congress to improved facilities for institutions which offer programs to train highly skilled technicians.

In the administration of these acts, the U.S. Office of Education directs its advisory, consultative, and financial assistance through the states, strengthening the long-established and effective federal-state-local relationship which recognizes that decisions and actions which shape the destiny of educational programs in the states must be by the states themselves. Although training programs for technicians are implemented by the states, leadership and assistance is provided by the Division of Vocational and Technical Education. This assistance is given through conferences, consultative advice, legal interpretations, suggestions as to the use of funds, the provision of suggested curriculum guides and similar materials, and in other ways.

Federal legislation has emphasized education as an important investment in people, and as a major element in the structure of our society. The education of skilled technicians is an essential part of such a program because the technician, with the scientist or engineer, is at the forefront of the technological developments which have made, and will probably continue to make, the greatest changes in our social and economic structure.

It follows that as more technicians are needed, *and are employed,* the number of good technician-education programs must increase. I have mentioned that both federal and local tax funds already support institutions which educate skilled technicians. However, the task of providing enough well trained technicians has just begun. Vocational educators cannot carry this new and tremendous burden alone. The guidance and assistance of the future employers of these trainees are needed if we are to succeed. Walter F. Carey, President of the Chamber of Commerce of the United States, said in a speech at Salt Lake City last October:

> The businessman is the key element in this whole education picture. Far better than any educator or government administrator, he is in a position to know what his company's skilled manpower requirements will be for the next five years, the next ten years. And the smartest thing he can do is to let the educators in his community in on the secret so they can adjust their program accordingly . . . . Some communities that now are operating effective vocational-technical schools have as many as 43 advisory committees involving up to 500 businessmen. Here trained management men put their knowledge and experience to work on the real core of the problem: how best to prepare men and women for productive jobs that exist today and for new opportunities that will open before them as our technological revolution progresses.

High Quality a *Sine Qua Non*

Really high quality is a mandatory requirement for successful technician-education programs. A competent, trained teaching staff, laboratories well equipped with apparatus representative of that used in the most up-to-date industrial establishments, a good library, adequate classrooms, and an administrative direction sincerely dedicated to quality occupational education are essential. It takes a minimum of five years and many thousands of dollars to establish a new program, assemble the staff, equip facilities, and graduate the first class or two. When these graduates are successfully employed and confidently advertising their success to their peers and parents, the program is well started.

A poor program is by far the most expensive of all because it costs almost as many dollars, wastes the time and the effort of students and school staff, and, worst of all, disappoints potential employers and disillusions students and their parents. *We can't afford programs of less than high quality!*

The image of the technicians' attractive occupational opportunities should be promoted and publicized vigorously, particularly to parents—many of whom may be employed by local industrial firms. The best conceived high-school counselors' guidance for many youths who could become excellent technicians is made fruitless because the youth's parents, girl friends, or buddies don't understand the dignity, challenges, and rewards available to the competent technician. For many able youths a high quality technician preparatory program is the most attractive available avenue to early employment, and one which often leads to further educational and professional attainment.

The problem of expert guidance and counseling for young people entering occupational training is one of the most difficult being faced today in the education field. All of us are deeply concerned that better methods be developed to help steer these people in the right direction. It seems certain that many potentially fine technicians never enter the field because they don't know it exists.

I met recently with the Committee on Specialized Personnel—a federal inter-agency group—and the entire session of its 106th meeting was devoted to the problems of guidance and counseling. The Committee is attempting to find solutions to the over-all problem of the shortage of highly skilled people.

Another federal agency which has been devoting a great deal of time and effort in the same area is the Panel on Scientific and Technical Manpower of the President's Science Advisory Committee. I hope to see this panel publish very shortly, under White House auspices, a paper on "Engineering Technician Training." Among other things, this paper will probably recommend an increase in the number of graduates of technical programs from the present 16,000 to at least 50,000 annually by 1970.

The development of institutions to educate technicians also provides adequate laboratories, libraries, and staff competencies which are useful to employers in another very important way. Today's graduate technician will find tomorrow that he needs to update his skills if he is to keep his job. Many people now on the job are finding that they need more basic mathematics, physical science, or specialized laboratory training. Knowledge in these fields can best be obtained in an organized school program. They are not likely to be learned adequately in an in-plant training program.

The establishment of high quality vocational programs for technicians pays an extra dividend by providing facilities for such upgrading programs on a part-time or evening basis. It is already true that schools which offer these programs enrol a larger number of already employed adults in such special courses than they do full-time young people in preparatory-technician curriculums.

Section 2

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Institutions Offering Technician Training

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Directory of Institutions Offering Technician Training

THIS directory of schools, colleges, and other institutions offering technician training has been compiled with the help of state directors of technical and vocational education, the Technical Education Branch of the U.S. Office of Education, the American Association of Junior Colleges, and the individual institutions involved.

Since the field is growing rapidly with some wide variations in definitions of technician training, there undoubtedly are omissions of schools that should be included and inclusions of other schools about which there may be questions as to whether they are offering strictly technician-training courses or other, but similar, types of courses.

In a majority of cases, the data in the listing were obtained from questionnaires returned by the institutions themselves. The administrators of the schools indicated the names and types of curriculums and courses offered, and, normally, the administrator's listings were accepted.

The technician curriculums listed without any identification mark following are preparatory curriculums (usually two years in length and requiring full-time attendance). An asterisk (*) following the listing indicates that the course is offered as an extension program (usually of varying lengths of time and requiring only part-time attendance). Two asterisks (**) indicates that the subject is offered both as a preparatory curriculum and as an extension course. A dagger (†) indicates that the curriculum has been approved by the Engineers' Council for Professional Development (ECPD).

Abbreviations used in the listings:

Accreditation Associations

ASCP—American Society of Clinical Pathologists
MSA—Middle States Association of Colleges and Secondary Schools
NCA—North Central Association of Colleges and Secondary Schools
NEA—New England Association of Colleges and Secondary Schools
NHSC—National Home Study Council
NWA—Northwest Association of Secondary and Higher Schools
SA—Southern Association of Colleges and Schools
WA—Western Association of Colleges and Schools

Other Abbreviations

ACT—American College Testing
CEEB—College Entrance Examination Board
GATB—General Aptitude Test Battery
GEDT—General Educational Development Test
SAT—Scholastic Aptitude Test
SCAT—School and College Ability Test
ad. ed.—adult education
adm.—administrator
chm.—chairman
coord.—coordinator
dir.—director
ind. ed.—industrial education
pres.—president
prin.—principal
supt.—superintendent
supv.—supervisor
tech. ed.—technical education
voc. ed.—vocational education

ALABAMA

Alabama Agricultural and Mechanical College, Normal 35762
Public. R. D. Morrison, pres.
Total enrolment: 1,465
Technician enrolment: 63
Accreditation: State Ed. Dept., SA
Admission: High-school graduation or equivalent with at least a C average
Electronics technology, drafting technology

Alabama Institute of Aviation Technology, 1439 S. Union Ave., Ozark
Public. Troy Tallis, dir.
Technician enrolment: 12
Admission: High-school graduation
Aircraft technology

Alabama School of Trades, 1001 E. Broad St., Gadsden
Public. E. L. Darden, dir.
Total enrolment: 450
Technician enrolment: 110
Accreditation: State Ed. Dept.
Admission: Well screened—varies with difficulty of course
Airconditioning and heating technology, civil technology, drafting technology, architectural drafting technology, electrical technology, electronics technology, industrial electronic technology, drafting and tool design, machine drafting and design, machine tool technology, mechanical design technology, mechanical technology, printing and photoengraving technology, welding technology

Brown Engineering School, Huntsville
Public
Electronic data processing technology

Calhoun County Vocational-Technical School, P. O. Box 193, Jacksonville
Public. A. B. Garmon, supv.
Technician enrolment: 11
Admission: High-school graduation
Electronics**

Carver State Vocational Technical School, P. O. Box 7175, Mobile
Public. A. L. Green, dir.
Total enrolment: 190
Technician enrolment: 17
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology*

Deshler High School, Tuscumbia
Public. Jack H. Vardaman, prin.
Technician enrolment: 14
Admission: High-school graduation
Electronics technology

George C. Wallace State Vocational Technical School, Dothan
Public
Electronics technology

Jefferson County Vocational School, 1318 Alabama Street, Tarrant 35217
Public. Murry C. Gregg, dir.
Total enrolment: 534
Technician enrolment: 140
Accreditation: State Ed. Dept.
Admission: 14 yrs. old
Architectural drafting technology**, building construction technology*, civil technology*, highway technology*, electrical technology**, electro-mechanical drafting technology**, electronic communications technology**, electronics technology, industrial electronic technology, airconditioning, heating, and refrigeration technology*, automotive technology**, drafting technology**, industrial drafting and design technology**, machine tool technology*

John M. Patterson State Vocational Technical School, P. O. Box 6199, Montgomery
Public. J. O. McCollough, dir.
Total enrolment: 284
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation, or take an aptitude test administered by State Employment Service
Computer technology, electronics technology, nursing, mechanical drafting technology

Mobile State Vocational-Technical School, 925 Dauphin Island Parkway, Mobile
Public. Clay Knight, dir.
Technician enrolment: 63
Admission: High-school graduation
Electronics technology, mechanical technology, drafting technology

Murphy High School, 100 S. Corlen St., Mobile
Public. R. B. Taylor, prin.
Total enrolment: 3,000
Technician enrolment: 300
Accreditation: SA
Admission: 16 yrs. old, able to succeed in occupation
Architectural drafting technology, building construction technology, electrical technology, dental technology, health technology, medical laboratory technology, medical records technology, medical technology, X-ray technology, automotive technology, drafting technology, industrial drafting and design technology, machine tool technology

Shelton State Vocational Technical School, Drawer J, East Side Station, Tuscaloosa
Public. H. I. James, dir.
Total enrolment: 300
Technician enrolment: 36
Accreditation: State Ed. Dept.
Admission: High-school graduation with math and science
Electronic data processing technology, electronics technology

Talladega High School, Talladega
Public. Frank Harwell, supt.
Technician enrolment: 9
Admission: High-school graduation
Electronics technology

Tennessee Valley State Technical-Junior College, P. O. Box 337, Decatur
Public. Carlton Kelley, pres.
Accreditation: State Ed. Dept.
Data processing technology, architectural drafting technology, architectural engineering technology, building construction technology, civil technology, highway technology, electrical technology, electronic communications technology, nursing, engineering science technology, instrumentation technology, airconditioning, heating, and refrigeration technology, auto-diesel technology, automotive technology, design technology, drafting technology, machine tool technology, mechanical and production engineering technology

United Electronics Institute, 2717 7th Ave., So., Birmingham. Home office: 3947 Park Drive, Louisville, Kentucky
Private. W. L. Rector, pres.
Total enrolment: 5,796
Technician enrolment: 5,796
Electronics technology**

Walker County High School, 1600 Highland Ave., Jasper
Public. Geddes Self, prin.
Total enrolment: 988
Technician enrolment: 81
Accreditation: SA
Electronics technology

ALASKA

Anchorage Community College, 1700 West Hillcrest Drive, Anchorage
Public. E. Short, res. dir.
Total enrolment: 1,600
Technician enrolment: 600
Accreditation: NWA
Admission: High-school graduation and 19 yrs. old.
Automotive technology*, civil and construction technology*, electronic data processing technology*, drafting technology*, electronics technology**

ARIZONA

Arizona State College, Flagstaff
Public. J. L. Walkup, pres.
Total enrolment: 5,500
Technician enrolment: 240
Accreditation: NCA
Admission: Upper ⅔ of high-school graduating class or by examination
Civil technology, drafting technology, electrical technology, electronics technology, computer technology, mechanical technology, surveying technology

Arizona Western College, Yuma
Public. Paul V. Braden, dean, voc.-tech. prog.
Total enrolment: 953
Technician enrolment: 250
Accreditation: U. of Ariz.
Admission: High-school graduation, restrictions on technical programs—cut off points on the ACT
Agri-business technology, data processing technology, civil engineering technology, surveying technology, computer technology, electronic engineering technology, graphic arts technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, mechanical technology, excavation engineering technology, general engineering technology, police science

Cochise College, Drawer L, Douglas
Public. Allan L. Petersen, assoc. dean, instruc.-tech. educ.
Total enrolment: 1,018
Admission: High-school graduation
Architectural engineering technology, civil technology, highway technology, nursing, drafting technology

Eastern Arizona Junior College, Thatcher
Public. Edwin R. Sorensen, dean, voc.-tech. educ.
Total enrolment: 700
Technician enrolment: 75
Admission: High-school graduation
Agricultural engineering technology, data processing technology, electro-mechanical drafting technology, engineering science technology, automotive technology, drafting technology, industrial technology

Mesa High School, Mesa
Public. R. A. Kilbourne
Total enrolment: 2,100
Technician enrolment: 24
Accreditation: NCA
Electronics technology*

Phoenix College, 1202 W. Thomas Rd., Phoenix 85013
Public. J. Lee Thompson, dean
Total enrolment: 4,000
Technician enrolment: 700
Accreditation: NCA
Admission: High-school graduation
Data processing technology, architectural drafting technology, architectural engineering technology, civil technology, electronic communications technology, electronics technology, nursing, drafting technology, fire-protection technology, food-processing technology

Phoenix Union High School, 512 E. Van Buren, Phoenix
Public. R. E. McCullar, prin.
Total enrolment: 5,306
Technician enrolment: 143
Accreditation: NCA
Admission: High-school graduation or equivalent, also open to some 12th grade students with aptitudes for a desired offering
Airconditioning and heating technology, drafting technology, electro-mechanical technology, drafting and tool design

ARKANSAS

Arkansas Vocational Technical School, 2220 W. 18th, Pine Bluff
Public. L. Coker, prin.
Total enrolment: 567
Technician enrolment: 253
Admission: 16 yrs. or older, high-school graduation preferred
Automotive technology, drafting technology, architectural drafting technology, electronics technology, industrial electronic technology, electrical technology, electronics communications technology, fluid power (engineering) technology*, hydraulics technology*, mechanical drafting technology**, mechanical technology, welding technology

El Dorado City School, El Dorado
Public. C. W. Easley, supv.
Total enrolment: 1,800
Technician enrolment: 136
Accreditation: NCA
Automotive technology*, airconditioning and heating technology*, pneumatic controls instrumentation*

Fayetteville Senior High School, Fayetteville
Public. William H. Duncan, prin.
Total enrolment: 1,105
Technician enrolment: 150
Accreditation: NCA
Airconditioning, heating, and refrigeration technology, automotive technology, drafting technology

Fort Smith Junior College, Fort Smith
Private. E. T. Vines, pres.
Total enrolment: 1,356
Technician enrolment: 80
Electronics technology, drafting technology, metallurgical technology, automotive technology

Jonesboro Senior High School, 301 Hurricane Drive, Jonesboro
Public. R. L. Bradbury, prin.
Total enrolment: 895
Technician enrolment: 79
Accreditation: NCA
Admission: Aptitude and intelligence
Electronics technology, automotive technology, machine tool technology, mechanical drafting technology

Little Rock University, 33rd and University Ave., Little Rock
Private. C. V. Stabler, pres.
Total enrolment: 2,500
Technician enrolment: 300
Accreditation: NCA
Admission: High-school graduation with satisfactory ACT scores, adults considered without graduation—GEDT acceptable
Architectural drafting technology, architectural engineering technology, civil technology, surveying technology, medical laboratory technology, medical technology, nursing, drafting technology

Metropolitan High School, Vocational-Technical Training, Interstate 30 and Scott Hamilton Dr., Little Rock
Public. Ernest L. Rush, supt.
Total enrolment: 700
Technician enrolment: 200
Accreditation: State Ed. Dept.
Architectural drafting technology**, electrical technology**, electronics technology**, health technology**, graphic arts technology**, lithographic technology**, airconditioning, heating, and refrigeration technology, automotive technology**, drafting technology**, machine tool technology**, food-processing technology**

Petit Jean Vocational Technical School, Morrilton
Public. T. Kirk, supt.
Highway technology, data processing technology, printing technology, automotive technology

CALIFORNIA

American River Junior College, 4700 College Oak Drive, Sacramento 41
Public. Kenneth D. Boettcher, pres.
Total enrolment: 3,981
Technician enrolment: 873
Accreditation: State Ed. Dept., WA
Admission: High-school graduation, non-

high-school graduates over 18 yrs. with demonstrated ability
Electronic data processing technology, drafting technology, electronic communications technology, industrial electronic technology, fire-protection technology

ANAHEIM EVENING HIGH SCHOOL, P.O. Box 3520, Anaheim
Public. Donald L. Bordsen, prin.
Total enrolment: 10,245
Technician enrolment: 350
Accreditation: State Ed. Dept.
Admission: Age, industrial background, and approval of instructors
Industrial electronics technology*, electronic data processing technology*, machine tool technology*, mechanical technology*, printing and photoengraving technology*

ANTELOPE VALLEY COLLEGE, 3041 West Ave. K, Lancaster 93534
Public. James M. Starr, pres.-supt.
Total enrolment: 2,534
Technician enrolment: 1,202
Accreditation: WA, State Ed. Dept.
Admission: High-school graduation, satisfactory score on placement test
Data processing technology, architectural drafting technology, surveying technology, computer technology, electronics technology, nursing, automotive technology, fire-protection technology, welding technology

BAKERSFIELD COLLEGE, 1801 Panorama Drive, Bakersfield
Public. E. Simonsen, pres.
Total enrolment: 3,200
Technician enrolment: 150
Accreditation: WA
Admission: Calif.—high-school graduation; out-of-state—individual basis, C+ average in high school
Automotive technology, electronic data processing technology, drafting technology, architectural drafting technology, electrical technology, electronics technology, industrial electronic technology, industrial technology, mechanical technology, engineer aide

BARSTOW COLLEGE, 2700 Barstow Rd., Barstow
Public. L. E. Wilbur, pres.
Total enrolment: 900
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Electronic data processing technology, architectural drafting technology, electronics technology, industrial technology, architectural engineering technology, surveying technology, electrical technology, electro-mechanical drafting technology, electro-mechanical technology, electronic communications technology, chemical technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, industrial technology, mechanical drafting technology

BELMONT ADULT SCHOOL, Los Angeles
Public. H. P. Lea, prin.
Total enrolment: 10,000
Technician enrolment: 3,000
Accreditation: U. of Calif.
Admission: Open to adults (18 yrs. or older)
Electronic data processing technology, drafting technology, architectural drafting technology

BURBANK EVENING HIGH SCHOOL, Burbank
Public. C. H. Read, dir. of adult edc.
Total enrolment: 5,500
Technician enrolment: 1,200
Accreditation: State Ed. Dept.
Admission: Standard state requirements
Automotive technology*, aeronautical technology*, electronic data processing technology*, drafting technology*, electrical technology*, electronics technology*, industrial electronic technology*, drafting and tool design*, machine tool technology*

CABRILLO COLLEGE, 6500 Soquel Drive, Aptos
Public. F. L. Younger, asst. supt. of instr.
Total enrolment: 2,750
Technician enrolment: 160
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Architectural drafting technology**, construction technology**, civil technology**, highway technology**, electronic communications technology**, electronics technology**, nursing, X-ray technology, drafting technology**

CAMPBELL ADULT HIGH SCHOOL, Campbell
Public
Electronics technology, mechanical drafting and design technology

CERRITOS COLLEGE, 11110 E. Alondra Blvd., Norwalk
Public. Jack W. Mears, pres.
Total enrolment: 8,700
Technician enrolment: 3,200
Accreditation: WA
Admission: High-school graduation or 18 yrs. old.
Chemical technology*, metallurgical technology, electrical technology*, data processing technology, architectural drafting technology, computer technology*, electro-mechanical drafting technology, electronic communications technology, industrial electronic technology, dental technology, nursing, engineering science technology*, automotive technology, design technology, drafting technology, industrial drafting and design technology, industrial illustration technology*, machine tool technology, mechanical drafting technology, welding technology, welding and metallurgical technology, tool design technology

CHABOT COLLEGE, 1177 Aladdin Ave., San Leandro
Public. R. L. Buffington, pres.
Total enrolment: 4,607
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older and able to profit from instruction
Electronic data processing technology, drafting technology, electronics technology, commercial design technology, structural engineering and design technology, surveying technology, dental technology, medical technology, nursing, automotive technology, machine tool technology, mechanical technology, fire-protection technology

CHAFFEY COLLEGE, Alta Loma
Public. D. B. Milliken, pres.
Total enrolment: 3,981
Accreditation: WA
Admission: 18 yrs. of age and ability to benefit from program
Aeronautical technology, aviation electronic technology, drafting technology, architectural technology, electronics technology, industrial electronic technology, printing and photoengraving technology

CITRUS COLLEGE, 18824 E. Foothill Blvd., Azusa
Public. Glenn G. Vaniman, pres.
Total enrolment: 5,533
Technician enrolment: 813
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Data processing technology, architectural drafting technology, surveying technology, computer technology, electrical technology, electronics technology, dental technology, ceramic technology, automotive technology, drafting technology, mechanical drafting technology

CITY COLLEGE OF SAN FRANCISCO, San Francisco
Public. L. G. Conlan, prin.
Total enrolment: 8,239
Technician enrolment: 3,000
Accreditation: WA
Admission: High-school graduation or

satisfactory scores on entrance exam
Architectural engineering technology†, building and contracting technology†, civil engineering technology†, design drafting technology†, electrical engineering technology†, electronic engineering technology†, general engineering technology†, mechanical engineering technology†

COALINGA COLLEGE, Coalinga
Public
Electronics technology

COGSWELL POLYTECHNICAL COLLEGE, 3000 Folsom St., San Francisco 10
Private. E. W. Smith, pres.
Total enrolment: 120
Technician enrolment: 120
Admission: High-school graduation with ability in science and math
Structural engineering technology†, electronic engineering technology†, mechanical engineering technology†

COLLEGE OF MARIN ADULT SCHOOL, Kentfield
Public. S. E. Epler, pres.
Total enrolment: 3,000
Technician enrolment: 60
Accreditation: WA
Admission: High-school graduation or over 18 yrs. old
Electronics technology, mechanical technology, civil technology, automotive technology

COLLEGE OF SAN MATEO, 1700 W. Hillsdale Blvd., San Mateo
Public. Julio L. Bortolazzo, supt.-pres.
Total enrolment: 19,000
Technician enrolment: 2,600
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Soils technology*, data processing technology**, architectural drafting technology**, aviation electronics technology, computer technology, commercial broadcast technology**, electronic communications technology**, electronic drafting technology**, electronics technology**, dental technology, medical laboratory technology, medical technology, nursing, aeronautical and astronautical (engineering) technology**, aviation maintenance technology**, aviation technology**, drafting technology**, industrial drafting and design technology**, industrial illustration technology**, machine tool technology**, mechanical and production engineering technology**

COLLEGE OF THE DESERT, Palm Desert
Public. R. C. McCall, pres.
Total enrolment: 3,100
Technician enrolment: 100
Accreditation: WA
Admission: High-school graduation or equivalent
Automotive technology, drafting technology, architectural drafting technology, electronics technology, industrial technology, machine tool technology

COLLEGE OF THE REDWOODS, 331 J St., Eureka 95501
Public. Eugene J. Portugal, pres.
Total enrolment: 800
Technician enrolment: 200
Agri-business technology, data processing technology, architectural drafting technology, electronics technology, forest products technology, automotive technology, drafting technology, fire-protection technology, police science

COLLEGE OF THE SEQUOIAS, Visalia
Public
Electronics technology

COLLEGE OF THE SISKIYOUS, R. 1, Box 1225, Weed
Public. W. E. Roberts, pres.
Total enrolment: 2,009
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Electrical and electronics technology

COMPTON COLLEGE, Compton
Public
Electronics technology, drafting and design technology, computer technology

CONTRA COSTA COLLEGE, 2801 Castro Road, San Pablo
Public. Raymond S. Dondero, pres.
Total enrolment: 4,856
Technician enrolment: 200
Accreditation: WA
Admission: Varies according to individual programs.
Civil technology, electronic data processing technology, architectural drafting technology, electronics technology, chemical technology, welding technology, electrical technology, nursing, drafting technology

CUBBERLEY ADULT SCHOOL, 4000 Middlefield Rd., Palo Alto
Public. T. F. Damon, prin.
Total enrolment: 1,540
Technician enrolment: 278
Accreditation: State Ed. Dept.
Automotive technology*, electronics technology*, welding*, building construction technology*

DIABLO VALLEY COLLEGE, Golf Club Rd., Concord
Public. William Niland, pres.
Total enrolment: 10,000
Technician enrolment: 1,600
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Drafting technology, electrical technology, electronics technology, industrial electronic technology, data processing technology, architectural drafting technology, architectural engineering technology, building construction technology, structural engineering and design technology, surveying technology, computer technology, electronic communications technology, dental technology, nursing, food-processing technology

EAST LOS ANGELES COLLEGE, 5357 E. Brooklyn Ave., Los Angeles 22
Public. B. K. Swartz, pres.
Total enrolment: 9,770
Technician enrolment: 3,691
Accreditation: WA, State Ed. Dept.
Admission: High-school graduation or qualified, mature student over 18
Construction technology, architectural drafting technology, electrical technology, electronics technology, commercial design technology, publications technology, architectural engineering technology, computer technology, electro-mechanical drafting technology, electromechanical technology, electronic drafting technology, industrial electronic technology, medical laboratory technology, medical records technology, nursing, design technology, drafting technology, industrial drafting and design technology, industrial illustration technology, police science

EL CAMINO COLLEGE, El Camino Via Torrance 90506
Public. S. E. Marsee, pres.
Total enrolment: 13,500
Technician enrolment: 2,500
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Chemical technology, metallurgical*, electronics technology, architectural drafting technology, building construction technology, electronic communications technology*, electronic drafting technology*, medical technology*, instrumentation technology*, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, industrial illustration technology, mechanical drafting technology, welding technology, police science

EL MONTE EVENING HIGH SCHOOL, 3048 N. Tyler Ave., El Monte
Public. Henry C. Blankenship, prin.
Total enrolment: 7,500

Technician enrolment: 250
Accreditation: WA
Data processing technology

Eureka City Schools Adult School, 1915 J Street, Eureka
Public. L. L. Kavich, prin.
Total enrolment: 3,000
Technician enrolment: 500
Accreditation: WA
Admission: Previous course work or experience
Automotive technology, drafting technology, machine tool technology, electrical technology*, mechanical drafting technology

Foothill College, 12345 El Monte Road, Los Altos Hills
Public. C. C. Flint, supt.-pres.
Total enrolment: 11,200
Technician enrolment: 3,350
Accreditation: WA, State Ed. Dept.
Admission: High-school graduation or equivalent
Drafting technology**, electronic data processing technology**, electronics technology**, technical publications technology**, electronic drafting technology*, nursing, X-ray technology, graphic arts technology**, tool design technology**, industrial illustration technology**, electro-photo-optical technology**

Fresno City College, 1101 University Ave., Fresno
Public. A. Bradshaw, pres.
Total enrolment: 6,500
Technician enrolment: 3,700
Accreditation: WA
Admission: High-school graduation or over 18 yrs. old
Airconditioning and heating technology, drafting technology, architectural drafting technology, electrical technology, data processing technology, building construction technology, structural engineering and design technology, industrial electronic technology, engineering science technology, instrumentation technology, auto-diesel technology, automotive technology, internal combustion (engineering) technology*, aviation maintenance technology, design technology*, industrial drafting and design technology, industrial illustration technology*, industrial technology, mechanical and production engineering technology*, fire-protection technology

Fullerton Junior College, 321 E. Chapman Ave., Fullerton
Public. H. L. Sheller, pres.
Total enrolment: 11,300
Technician enrolment: 1,400
Accreditation: WA and State Ed. Dept.
Admission: High-school graduation or equivalent
Automotive technology**, civil technology, civil and construction technology**, electronic data processing technology**, drafting technology**, architectural drafting technology**, electrical technology**, electro-mechanical drafting technology**, electronics technology**, industrial electronic technology**, industrial technology**, drafting and tool design**, machine drafting and design**, metallurgical technology**, agri-business technology*, soils technology*, publications technology**, building construction technology**, highway technology*, surveying technology, electro-mechanical technology**, electronic communications technology*, electronic drafting technology**, dental technology**, medical records technology**, medical technology**, nursing, X-ray technology**, graphic arts technology**, internal combustion (engineering) technology*, industrial drafting and design technology**, mechanical drafting technology**, food-processing technology*

Gavilan College, P. O. Box 126, Gilroy
Public. Ralph Schroder, pres.
Total enrolment: 655
Technician enrolment: 140
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Architectural drafting technology, surveying technology, aviation maintenance technology, aviation technology, drafting technology

Glendale College, 1500 North Verdugo Rd., Glendale
Public. R. D. Haugh, pres.
Total enrolment: 3,000
Technician enrolment: 800
Accreditation: WA
Admission: High-school graduation or over 18 yrs. old
Drafting technology, electronic technology**, machine tool technology, data processing technology**, building construction technology, electro-mechanical drafting technology, aviation maintenance technology, aviation technology, industrial drafting and design technology, industrial illustration technology, industrial technology**, mechanical drafting technology, fire-protection technology*

Grantham School of Electronics, 1505 N. Western Ave., Hollywood
Private. Donald J. Grantham, pres.
Total enrolment: 700
Accreditation: National Home Study Council
Admission: High-school graduation or equivalent
Electronic technology**, electronic communications technology*, commercial broadcast technology*

Grossmont College, 8800 Grossmont College Drive, El Cajon 92020
Public. C. A. Paul, dir. of tech.-voc. edc.
Total enrolment: 3,060
Accreditation: WA
Admission: High-school graduation or adult
Data processing technology**, statistical technology*, architectural drafting technology**, construction technology**, civil technology**, surveying technology, computer technology, electronics technology**, industrial electronic technology**, dental technology, medical laboratory technology, instrumentation technology, drafting technology, industrial drafting and design technology*, industrial illustration technology, industrial technology, mechanical drafting technology**

Hanford Adult School, 120 E. Grangeville Blvd., Hanford
Public. R. K. Attebery, prin.
Total enrolment: 596
Technician enrolment: 19
Accreditation: U. of Calif.
Architectural drafting technology

Hartnell College, Salinas
Public
Electronics technology

Huntington Park Adult School, 6020 Miles Ave., Huntington Park
Public. A. A. McIntyre, dir.
Total enrolment: 2,400
Accreditation: State Ed. Dept.
Drafting technology, architectural technology, electronics technology, drafting and tool design, machine drafting and design

John A. O'Connell Evening Vocational High School and Technical Institute,
San Francisco
Electrical technology*, electronics technology*, mechanical technology*, nucleonics*

Lassen College, 1110 Main St., Susanville
Public. R. E. Aspegren, dir.
Total enrolment: 466
Technician enrolment: 104
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Forestry technology†

Lompoc High School, Lompoc
Public
Electronics technology

LONG BEACH CITY COLLEGE, 4901 E. Carson St., Long Beach 90808
Public. Wiley D. Garner, pres.
Total enrolment: 25,568
Technician enrolment: 1,144
Accreditation: WA
Admission: High-school graduation
Data processing technology, architectural drafting technology, building construction technology, construction technology, electrical technology, electro-mechanical technology, electro-mechanical drafting technology, electronic drafting technology, electronics technology, nursing, airconditioning, heating, and refrigeration technology, auto-diesel technology, automotive technology, aviation maintenance technology, machine tool technology, fire-protection technology

LOS ANGELES CITY COLLEGE, Los Angeles
Public. J. Lombardi, pres.
Total enrolment: 17,119
Accreditation: WA
Admission: High-school graduation
Electronics**, mechanical technology**, aeronautical technology, architectural and civil technology, chemical technology

LOS ANGELES EVENING HIGH SCHOOL, Los Angeles
Public. P. Chambers, prin.
Total enrolment: 4,500
Technician enrolment: 95
Accreditation: U. of Calif.
Electronics technology*, drafting and tool design*, machine drafting and design*

LOS ANGELES HARBOR COLLEGE, 1111 Figueroa Place, Wilmington 90744
Public. W. C. Black, pres.
Total enrolment: 5,000
Technician enrolment: 525
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Civil and construction technology, drafting technology, architectural drafting technology, electrical technology, electronics technology, drafting and tool design, machine tool technology, instrumentation technology, architectural engineering technology, building construction technology, surveying technology, electro-mechanical technology, electro-mechanical drafting technology, nursing, chemical technology, graphic arts technology, lithographic technology, airconditioning, heating, and refrigeration technology, auto-diesel technology, mechanical drafting technology, mechanical technology, fire-protection technology, space technology, police science

LOS ANGELES METROPOLITAN COLLEGE, Los Angeles
Public
Electronic data processing technology

LOS ANGELES PIERCE COLLEGE, 6201 Winnetka Ave., Woodland Hills
Public. J. B. Shepard, pres.
Total enrolment: 10,636
Technician enrolment: 250
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older, day students must take GATB
Drafting technology, electro-mechanical technology**, electronics technology, industrial electronic technology**, machine tool technology, agri-business technology, agricultural engineering technology, soils technology, commercial design technology, data processing technology, architectural drafting technology, building construction technology, construction technology, surveying technology, computer technology, electro-mechanical drafting technology, electronic communications technology, industrial electronic technology, medical records technology, design technology, industrial drafting and design technology, industrial illustration technology, mechanical drafting technology, mechanical technology

LOS ANGELES TRADE-TECHNICAL COLLEGE, 400 West Washington Blvd., Los Angeles 90015
Public. F. P. Wilber, pres.
Total enrolment: 10,435
Technician enrolment: 8,000
Accreditation: WA
Admission: Aptitude tests, 18 yrs. or older or high-school graduation, ability to profit by instruction
Architectural drafting technology, building construction technology, aviation electronics technology, electrical technology, electro-mechanical drafting technology, electronic communications technology, electronic drafting technology, electronics technology, industrial electronic technology, nursing, engineering science technology, graphic arts technology, instrumentation technology, lithographic technology, metallurgical technology, textile engineering technology, airconditioning, heating, and refrigeration technology, auto-diesel technology, automotive technology, aviation maintenance technology, aviation technology, design technology, drafting technology, industrial drafting and design technology, industrial illustration technology, industrial technology, machine technology, mechanical drafting technology, mechanical technology, food-processing technology, plastics technology

LOS ANGELES VALLEY COLLEGE, 5800 Fulton Ave., Van Nuys
Public. William J. McNelis, pres.
Total enrolment: 15,000
Technician enrolment: 1,400
Accreditation: WA
Admission: High-school graduation or 18 yrs. or over and ability to profit from instruction
Aviation electronic technology, electronic data processing technology, electronics technology, computer technology, surveying technology, commercial broadcast technology, electronic communications technology*, electronic drafting technology*, nursing, chemical technology*, nucleonics, industrial illustration technology*, machine tool technology, mechanical drafting technology, police science, fire science

LUTHER BURBANK SENIOR HIGH SCHOOL, 3500 Florin Rd., Sacramento 23
Public. Oliver A. Livoni, prin.
Total enrolment: 2,350
Technician enrolment: 60
Accreditation: WA
Architectural drafting technology, surveying technology, electrical technology

MANUAL ARTS HIGH SCHOOL, 4131 S. Vermont Ave., Los Angeles 90037
Public. Donald L. Pennington, prin.
Total enrolment: 3,200
Technician enrolment: 68
Accreditation: State Ed. Dept.
Admission: 18 yrs. old min.
Electronic communications technology

MERCED COLLEGE, 920 J St., Merced
Public. Lowell F. Barker, supt.-pres.
Total enrolment: 2,181
Technician enrolment: 75
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Architectural drafting technology*, surveying technology, electronics technology, nursing, drafting technology

MERRITT COLLEGE, 5714 Grove St., Oakland 94609
Public. E. H. Redford, pres.
Total enrolment: 6,500
Technician enrolment: 250
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Civil technology, X-ray technology, chemical technology, mechanical drafting technology, mechanical technology

MODESTO JUNIOR COLLEGE, Modesto
Public
Electronics technology, civil technology, electronic data processing technology

MONTEBELLO ADULT HIGH SCHOOL, Montebello
Public
Electronics technology

MONTEREY HIGH SCHOOL, P. O. Box 1031, Monterey
Public. R. Charlsen, prin.

Total enrolment: 1,200
Technician enrolment: 200
Accreditation: WA
Architectural drafting technology, building construction technology, electronic drafting technology, electronics technology, industrial electronic technology, automotive technology, drafting technology, machine tool technology

Monterey Peninsula College,
980 Fremont, Monterey
Public. George J. Paul, pres.
Total enrolment: 3,858
Technician enrolment: 750
Accreditation: WA
Admission: 18 yrs. or older or high-school graduation
Civil technology, electronic data processing technology**, electronics technology**, industrial electronic technology**, architectural drafting technology, building construction technology*, construction technology*, highway technology*, surveying technology**, computer technology*, commercial broadcast technology*, electrical technology*, electronic communications technology**, electronic drafting technology, dental assisting technology**, medical assisting technology**, instrumentation technology*, fire-protection technology*, food-processing technology*, photographic technology*, police science**

Mount San Antonio College,
1100 N. Grand Ave., Walnut
Public. O. H. Edinger, Jr., pres.
Total enrolment: 10,326
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Airconditioning and heating technology*, aeronautical technology*, aviation electronic technology**, civil technology*, civil and construction technology*, electronic data processing technology**, drafting technology**, architectural drafting technology*, electrical technology**, electronics technology**, industrial electronic technology**, agri-business technology, agricultural engineering technology, soils technology, surveying technology*, aviation electronics technology*, electro-mechanical drafting technology*, electronic communications technology*, electronic drafting technology*, nursing**, metallurgical technology*, aviation maintenance technology**, design technology**, hydraulics (water) technology*, industrial drafting and design technology**, industrial illustration technology*, fire-protection technology*, tool design technology*, quality control technology*

Mountain View-Los Altos Adult School, Box 640, Mountain View
Public. L. S. Allen, dir.
Total enrolment: 3,554
Technician enrolment: 140
Accreditation: WA
Admission: High-school graduation, 19 yrs. old, or married
Drafting technology*, electronics technology*, data processing technology*, electrical technology*, mechanical technology*

Northrop Institute of Technology,
1155 W. Arbor Vitae St., Inglewood 1
Private. H. W. Hartley, pres.
Total enrolment: 1,586
Technician enrolment: 116
Accreditation: WA
Admission: High-school graduation from college preparatory program
Aeronautical technology†, electronics technology†, engineering technology†, aviation maintenance technology†

Orange Coast College,
2701 Fairview Road, Costa Mesa
Public. Robert B. Moore, pres.
Total enrolment: 5,800
Technician enrolment: 1,200
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Agri-business technology**, soils technology**, architectural drafting technology**, building construction technology**, civil technology**, data processing technology**, electro-mechanical drafting technology**, electro-mechanical technology**, electronics technology**, dental technology*, nursing**, X-ray technology**, automotive technology**, machine tool technology**, sheet metal technology**, metal trades technology**, petroleum technology**

Palomar College, San Marcos
Public. J. W. Dunn, pres.
Total enrolment: 3,400
Technician enrolment: 130
Accreditation: WA
Admission: High-school graduation
Automotive technology*, drafting technology, electronics technology

Pasadena City College,
1570 E. Colorado Blvd.,
Pasadena 91106
Public. Armen Sarafian, pres.
Total enrolment: 12,900
Technician enrolment: 2,042
Accreditation: WA
Admission: High-school graduation or over 18 yrs. old
Commercial design technology, data processing technology, publications technology, architectural drafting technology, architectural engineering technology, building construction technology, civil technology, surveying technology, computer technology, commercial broadcast technology, electrical technology, electronic drafting technology, dental technology, medical laboratory technology, nursing, ceramic technology, graphic arts technology, lithographic technology, automotive technology, design technology, drafting technology, industrial drafting and design technology, machine tool technology, mechanical drafting technology, fire-protection technology, police science

Phineas Banning Adult School,
1500 N. Avalon Blvd., Wilmington
Public. Arthur A. McIntyre, prin.
Total enrolment: 2,700
Technician enrolment: 1,000
Accreditation: State Ed. Dept.
Admission: High-school graduation or 18 yrs. or older, or high-school dropout with day principal's request
Automotive technology*, airconditioning and heating technology*, drafting technology*, electrical technology*, electronics technology*, industrial electronic technology*, industrial technology*, drafting and tool design*, mechanical design technology*, mechanical technology*, nucleonics*, architectural drafting technology, electronic drafting technology, nursing, industrial technology, machine tool technology

Porterville College, P. O. Box 952,
Porterville 93257
Public. O. H. Shires, dir.
Total enrolment: 546
Accreditation: WA
Admission: High-school graduation or 18 yrs. old
Agri-business technology, soils technology, architectural drafting technology, architectural engineering technology, building construction technology, nursing, engineering science technology, forest products technology, auto-diesel technology

Reedley College, Reed and Manning
Ave., Reedley
Public. C. M. Boyer, pres.
Total enrolment: 1,444
Technician enrolment: 502
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Agri-business technology**, soils technology*, aviation electronics technology**†, electronics technology**†, dental technology (dental assistant)**, automotive technology**, combustion power technology**, avia-

tion maintenance technology**, aviation technology*, agri-power technology, landscape horticulture technology**, agri-chemical technology, agricultural inspection technology

Rio Hondo Junior College, 11962 E. Florence Ave., Santa Fe Springs
Public. Phil H. Putnam, supt.-pres.
Total enrolment: 2,452
Technician enrolment: 212
Accreditation: WA, State Ed. Dept.
Admission: High-school graduation or 18 yrs. of age or over
Data processing technology**, publications technology**, architectural drafting technology**, electronics technology**, industrial electronic technology**, nursing*, engineering science technology**, drafting technology**, industrial drafting and design technology**, industrial illustration technology*, industrial technology**, fire-protection technology**, police science**

Riverside City College, 3650 Fairfax Ave., Riverside
Public. R. H. Bradshaw, supt.
Total enrolment: 3,000
Technician enrolment: 350
Accreditation: WA
Admission: High-school graduation
Data processing technology, computer technology, electronics technology, graphic arts technology, automotive technology

Roosevelt Adult School, 450 South Fickett Street, Los Angeles
Public. G. L. Gardner, prin.
Total enrolment: 3,600
Technician enrolment: 310
Accreditation: State Ed. Dept.
Admission: 18 yrs. of age or over
Drafting technology, automotive technology, electrical technology, electronics technology, architectural drafting technology, nursing (aide), ceramic technology, mechanical drafting technology

Sacramento City College, Sacramento
Public. H. H. Stephenson, pres.
Total enrolment: 5,068
Technician enrolment: 575
Accreditation: WA
Admission: High-school graduation, or 18 yrs. or older with demonstrated ability
Automotive technology, aeronautical technology, civil technology, construction technology, electronics technology, mechanical engineering technology, metals technology

San Benito College, Hollister
Public. R. Schroder, dir.
Total enrolment: 300
Accreditation: WA
Admission: High-school graduation or 18 years or older and able to profit from post-high-school education
Civil technology, electronics technology

San Bernardino Adult Vocational School, 1850 E St., San Bernardino
Public. Clarence L. Sorenson, prin.
Total enrolment: 1,800
Technician enrolment: 1,800
Electronic communications technology

San Bernardino Valley College, 701 S. Mt. Vernon Ave., San Bernardino
Public. H. J. Sheffield, pres.
Total enrolment: 10,000
Technician enrolment: 3,000
Accreditation: WA
Admission: High-school graduation or over 18 years of age and able to profit from instruction
Automotive technology, airconditioning and heating technology, aeronautical technology, electronic data processing technology, drafting technology, electrical technology, industrial electronic technology, industrial technology, structural technology, aviation electronics technology, commercial broadcast technology, electronic communications technology, medical laboratory technology, medical records technology, nursing, radiation technology, X-ray technology, auto-diesel technology, combustion power technology, internal combustion (engineering) technology, aviation maintenance technology, aviation technology, mechanical drafting technology, fire-protection technology, police science

San Diego City College, 1425 Russ Blvd., San Diego 92101
Public. R. Gorton, dir.
Total enrolment: 3,200
Technician enrolment: 700
Accreditation: WA
Admission: High-school graduation
Commercial design technology, data processing technology, publications technology, architectural drafting technology, architectural engineering technology, building construction technology, computer technology, commercial broadcast technology, electrical technology, electronic communications technology, electronic drafting technology, electronics technology, engineering science technology, graphic arts technology, airconditioning, heating, and refrigeration technology, auto-diesel technology, automotive technology, aeronautical and astronautical (engineering) technology, aviation maintenance technology, aviation technology, industrial drafting and design technology, industrial illustration technology, mechanical and production engineering technology, mechanical drafting technology, fire-protection technology, police science

San Fernando Adult School, 11133 O'Melveny Ave., San Fernando 91340
Public. Edward L. Alberts, prin.
Total enrolment: 10,000
Technician enrolment: 1,300
Accreditation: U. of Calif.
Admission: 18 yrs. of age
Soils technology, data processing technology, building construction technology, computer technology, electronics technology, industrial electronic technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, mechanical drafting technology

San Joaquin Delta College, Stockton
Public
Electronics technology, electronic data processing technology

San Jose City College, 2100 Moorpark Ave., San Jose
Public. H. R. Buchser, pres.-supt.
Total enrolment: 10,000
Technician enrolment: 1,800
Accreditation: WA
Admission: High-school graduation or 19 yrs. or older, with ability to profit from instruction
Data processing technology**, computer technology**, electrical technology**, electronics technology**, nursing, X-ray technology, airconditioning, heating, and refrigeration technology*, automotive technology, drafting technology**, industrial technology, machine tool technology**, fire-protection technology**, vacuum technology**, welding technology

San Luis Obispo County Junior College, Camp San Luis Obispo, Route 2, Box 426, San Luis Obispo 93401
Public. Merlin E. Eisenbise, pres.-supt.
Total enrolment: 700
Technician enrolment: 200
Accreditation: State Ed. Dept.
Agri-business technology, agricultural engineering technology, architectural drafting technology, architectural engineering technology, structural engineering technology, surveying technology, dental technology, health technology, medical laboratory technology, automotive technology, combustion power technology, internal combustion (engineering) technology, drafting technology, mechanical drafting technology

Santa Ana College, Santa Ana
Public. J. E. Johnson, pres.
Total enrolment: 5,535
Accreditation: State Ed. Dept. and WA
Admission: High-school graduation or 18 yrs. or older

Automotive technology, drafting technology, architectural drafting technology, electronics technology, drafting and tool design, machine drafting and design, machine tool technology, data processing technology, architectural engineering technology, surveying technology, industrial electronic technology, auto-diesel technology, combustion power technology

Santa Barbara City College, 721 Cliff Dr., Santa Barbara
Public. Robert C. Rockwell, pres.
Total enrolment: 2,400
Technician enrolment: 330
Accreditation: WA
Admission: High-school graduation or over 18 yrs. old
Publications technology, building construction technology*, electronics technology, medical laboratory technology, graphic arts technology, automotive technology

Santa Cruz Adult High School, Santa Cruz
Public
Mechanical drafting and design technology, electronics technology

Santa Monica City College, 1815 Pearl St., Santa Monica
Public. W. F. Thomas, Jr., pres.
Total enrolment: 12,000
Technician enrolment: 2,000
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Automotive technology**, drafting technology**, architectural drafting technology**, electronics technology**, welding technology**, building construction technology**, commercial broadcast technology, electronic communications technology**, nursing, graphic arts technology, lithographic technology**, industrial drafting and design technology**, fire-protection technology**, police science**, construction technology, surveying technology, electrical technology**, industrial electronic technology**, machine tool technology**

Santa Rosa Junior College, Santa Rosa
Public
Electronics technology

Shasta College, 2500 Eureka Way, Redding
Public. G. A. Collyer, pres.
Total enrolment: 1,910
Technician enrolment: 325
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Electronics technology, agri-business technology, medical technology, automotive technology

Sierra Junior College, 5000 Rocklin Rd., Rocklin
Public. Harold Weaver, pres.
Total enrolment: 1,450
Technician enrolment: 400
Accreditation: WA
Admission: High-school graduation or 18 yrs. of age
Agri-business technology, architectural drafting technology, architectural engineering technology, civil technology, structural engineering and design technology, surveying technology, commercial broadcast technology, electrical technology, electro-mechanical technology, electro-mechanical drafting technology, electronic drafting technology, electronics technology, nursing, forest products technology, automotive technology, combustion power technology, drafting technology, industrial technology

South Gate Adult School, 3351 Firestone Blvd., South Gate 90280
Public. L. E. Hotchkiss, prin.
Total enrolment: 1,625
Technician enrolment: 475
Accreditation: WA
Admission: 18 yrs. of age or older
Automotive technology, drafting technology, architectural drafting technology, electrical technology, electronics technology, industrial electronic technology, printing technology, agri-business technology, auto-diesel technology, machine tool technology, mechanical drafting technology

Southwestern College, Chula Vista
Public
Electronic data processing technology

Taft College, Taft
Public. R. L. Matthai, dean
Total enrolment: 930
Technician enrolment: 175
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Automotive technology, drafting technology, architectural drafting technology, electronics technology, industrial technology, building construction technology, civil technology, graphic arts technology, industrial drafting and design technology, industrial technology

Vallejo College, Whitney at Mini Dr., Vallejo
Public. C. A. McDonald, pres.
Total enrolment: 3,364
Technician enrolment: 451
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Automotive technology**, construction technology*, electrical technology*, electronics technology*, mechanical technology*, metallurgical technology*, photography technology**, building construction technology*, nursing, industrial technology*, sheet metal**

Ventura College, Ventura
Public. E. H. Rowins, pres.
Total enrolment: 8,255
Technician enrolment: 2,670
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Civil technology**, electronic data processing technology*, drafting technology*, architectural drafting technology*, electrical technology*, electro-mechanical technology*, electronics technology**, industrial electronic technology**, drafting and tool design**, machine technology*, mechanical design technology**, automotive technology*, welding technology*

Victor Valley College, P. O. Box 910, Victorville
Public. F. F. Berger, pres.
Total enrolment: 1,300
Technician enrolment: 540
Accreditation: WA
Admission: High-school graduation or 18 yrs. or older
Drafting technology, electronics technology, data processing technology, fire-protection technology, police science

Western States College of Engineering, 970 W. Manchester Ave., Inglewood
Private
Total enrolment: 170
Technician enrolment: 110
Admission: High-school graduation or equivalent
Computer technology, electrical technology, electronic communications technology, electronics technology

COLORADO

Adams State College, Alamosa
Public. F. Plachy, pres.
Total enrolment: 1,750
Technician enrolment: 50
Accreditation: NCA
Admission: Upper ⅔ high-school graduating class and recommendation of principal (resident), upper ½ (non-resident)
Data processing technology, medical technology

Boulder High School, Boulder
Public. B. F. Allen, dir.
Accreditation: NCA
Admission: Specified in Title VIII, Area Vocational Education, NDEA
Electronics technology, electronics drafting

BOULDER VALLEY VOCATIONAL-TECHNICAL CENTER, P. O. Box 186, Boulder
Public. Basil F. Allen, dir.
Total enrolment: 200
Technician enrolment: 75
Accreditation: State Bd. for Voc. Ed.
Admission: Testing and screening by admissions committee
Automotive technology**, electronic data processing technology*, drafting technology**, electrical technology**, electronics technology*

COLORADO STATE UNIVERSITY, Fort Collins
Public
Electronic data processing technology

EMILY GRIFFITH OPPORTUNITY SCHOOL, 1250 Welton St., Denver 80204
Public. R. L. Casement, prin.
Total enrolment: 36,000
Technician enrolment: 500
Accreditation: NCA, State Ed. Dept.
Admission: Specified in Title VIII, Area Vocational Ed., NDEA
Electronics technology, data processing technology, architectural drafting technology, aviation electronics technology, industrial electronic technology, ceramic technology, airconditioning, heating, and refrigeration technology, automotive technology, aviation maintenance technology, drafting technology, mechanical drafting technology

LAMAR JUNIOR COLLEGE, 804 S. 8th, Lamar
Public. H. C. Kelley, pres.
Total enrolment: 500
Technician enrolment: 125
Accreditation: State Ed. Dept.
Admission: High-school graduation or GEDT
Electronics technology, agri-business technology, data processing technology, nursing, automotive technology

MESA COUNTY JUNIOR COLLEGE, Grand Junction
Public. W. A. Medesy, pres.
Total enrolment: 1,468
Technician enrolment: 25
Accreditation: NCA
Admission: Residents, high-school graduation. Non-residents, upper ⅔ of high-school graduating class
Electronic data processing technology, nursing

NORTHEASTERN JUNIOR COLLEGE, Sterling
Public. E. S. French, pres.
Total enrolment: 1,151
Technician enrolment: 238
Accreditation: NCA
Admission: Residents, high-school graduation. Non-residents, upper ¾ of graduating class
Civil technology, electronics technology, agri-business technology, soils technology, surveying technology, nursing, chemical technology, automotive technology, drafting technology

OTERO JUNIOR COLLEGE, La Junta
Public. G. G. Carnes, dir.
Total enrolment: 420
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: Graduation from high school or equivalent
Civil technology, electronic data processing technology, machine drafting and design, mechanical technology

RANGELY COLLEGE, Rangely
Public. John E. Roberts, pres.
Total enrolment: 138
Technician enrolment: 52
Accreditation: NCA
Admission: Special requirements for technician-training courses
Electronics technology

SOUTHERN COLORADO STATE COLLEGE, Pueblo 81005
Public. Leland A. Benz, dean, trade-tech. div.
Total enrolment: 4,245
Technician enrolment: 713
Accreditation: NCA
Admission: Residents, high-school graduation. Non-residents, high-school graduation, and in upper ½ of graduating class. Trade-technical programs, high-school graduation and in upper ⅔ of graduating class.
Automotive technology, airconditioning and heating technology, civil technology, electronic data processing technology, electronics technology, mechanical technology, metallurgical technology, nursing, X-ray technology, diesel technology

TRINIDAD STATE JUNIOR COLLEGE, Trinidad
Public. C. O. Banta, dean
Total enrolment: 850
Technician enrolment: 300
Accreditation: NCA, State Ed. Dept.
Civil technology, electronics technology, chemical technology, data processing technology, building construction technology, computer technology, nursing, engineering science technology, automotive technology, industrial drafting and design technology

CONNECTICUT

BULLARD-HAVENS TECHNICAL SCHOOL, Evening Institute, Bridgeport
Public. F. Okula, supv.
Total enrolment: 297
Accreditation: State Ed. Dept.
Admission: High-school graduation and passing engineering aptitude test
Chemical technology*, metallurgical technology**, electronics technology*, mechanical technology**

E. C. GOODWAIN TECHNICAL SCHOOL, Evening Institute, New Britain
Public. K. Fogg, supv.
Total enrolment: 111
Accreditation: State Ed. Dept.
Admission: High-school graduation and passing engineering aptitude test
Electrical technology, electronics technology**, mechanical technology**

ELI WHITNEY TECHNICAL SCHOOL, Evening Institute, Hamden
Public. J. Higgiston, supv.
Total enrolment: 129
Accreditation: State Ed. Dept.
Admission: High-school graduation and passing engineering aptitude test
Civil and construction technology, electrical technology, electronics technology, mechanical technology

HARTFORD STATE TECHNICAL INSTITUTE, 401 Flatbush Ave., Hartford
Public. T. V. Raimondi, dir.; J. Volk, supv., Evening Institute
Total enrolment: 360
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electrical technology**†, mechanical technology**†, tool technology†, data processing technology*

HARVARD H. ELLIS REGIONAL VOCATIONAL TECHNICAL SCHOOL, P. O. Box 149, Danielson
Public. Alton P. Aldrich, dir.
Total enrolment: 350
Technician enrolment: 350
Accreditation: State Ed. Dept.
Electrical technology, electronics technology, industrial electronic technology, automotive technology, aviation maintenance technology, drafting technology, industrial drafting and design technology, machine tool technology, mechanical drafting technology

HENRY ABBOTT TECHNICAL SCHOOL, Evening Institute, Hayestown Ave., Danbury
Public. O. Truderung, supv.
Total enrolment: 525
Technician enrolment: 185
Accreditation: State Ed. Dept.
Admission: High-school graduation and passing of engineering aptitude test
Civil technology*, electrical technology*, electro-mechanical technology*, machine tool technology*, mechanical technology*, computer technology*, chemical technology*

HORACE C. WILCOX TECHNICAL SCHOOL, Evening Institute, Oregon Rd., Meriden

Public. Edward J. Tonkowicz, supv. adult ed.
Technician enrolment: 169
Accreditation: State Ed. Dept.
Admission: High-school graduation and engineering aptitude test
Civil technology*†, electrical technology*†, electro-mechanical technology*†, machine tool technology*†

J. M. Wright Technical School, Evening Institute, Stamford
Public. E. Kelly, supv.
Total enrolment: 1,884
Technician enrolment: 596
Accreditation: State Ed. Dept.
Admission: 2 units in mathematics, one unit in lab. science, entrance examination, high-school graduation
Electrical technology*, electro-mechanical technology*, electronics technology*, machine drafting and design*, machine tool technology*, mechanical technology*, metallurgical technology*

Manchester Community College, Manchester
Public. Frederick W. Lour, Jr., dean
Total enrolment: 200
Technician enrolment: 8
Accreditation: State Ed. Dept.
Admission: High-school graduation
Medical laboratory technology, mechanical drafting technology*

Norwalk State Technical Institute, Richards Ave., South Norwalk
Public. F. L. Juszli, dir., Evening Institute
Total enrolment: 1,375
Technician enrolment, 1,375
Accreditation: State Ed. Dept.
Admission: High-school graduation, two units in mathematics, one unit in laboratory science, entrance examination
Electronic data processing technology, electrical technology**, electro-mechanical technology**, mechanical technology**, metallurgical technology**, chemical technology**, architectural drafting technology*, civil technology*, computer technology**, tool and manufacturing technology

Oliver Wolcott Technical School, Evening Institute, Torrington
Total enrolment: 88
Admission: High-school graduation and passing of engineering aptitude test
Electrical technology*, mechanical technology*

Prince Technical School, Hartford
Public. J. De Mino, dir.
Electronics technology**, mechanical technology**

Thames Valley State Technical Institute, 574 New London Turnpike, Norwich 06360
Public. D. R. Welter, dir.
Total enrolment: 590
Technician enrolment: 220
Accreditation: State Ed. Dept.
Admission: High-school graduation, 2 yrs. math, one year of a laboratory science, and SAT
Electronic data processing technology*, drafting technology*, electrical technology**, machine tool technology*, mechanical technology, metallurgical technology, instrumentation*, chemical technology, computer technology, electronic drafting technology*, air-conditioning, heating, and refrigeration technology*, hydraulics technology*, mechanical and production engineering technology*, mechanical drafting technology*

Ward Technical Institute, University of Hartford, 44 Niles Street, Hartford 5
Private. R. F. Lescarbeau, dir. of training
Total enrolment: 320
Technician enrolment: 320
Accreditation: State Ed. Dept., NEA
Admission: High-school graduation—CEEB, two yrs. math, physics for degree program, lab science may be substituted for indus. tech. program
Electronics technology, industrial electronic technology, electro-mechanical technology, electronic communications technology, industrial instrumentation

Warren F. Kaynor Technical School, Evening Institute, Waterbury
Public. J. Rossi, actg. supv.
Total enrolment: 363
Accreditation: State Ed. Dept.
Admission: High-school graduation and engineering aptitude test
Electrical technology, mechanical technology**

Waterbury State Technical Institute 1460 W. Main St., Waterbury 06708
Public. Carmelo S. Greco, dir.
Total enrolment: 650
Technician enrolment: 650
Accreditation: State Ed. Dept.
Admission: High-school graduation, two yrs. math, one year physical science with lab
Surveying technology*, computer technology**, electrical technology**, electronics technology**, chemical technology**, metallurgical technology**, mechanical technology**, tool and manufacturing technology**

Windham Technical School, 210 Birch St., Willimantic
Public. Alfred F. Dorosz, dir.
Total enrolment: 370
Technician enrolment: 90
Electronics technology, architectural drafting technology, mechanical drafting technology

DELAWARE

H. Fletcher Brown Technical High School, 14th & Market Sts., Wilmington 19801
Public. Leon F. Osinski, prin.
Accreditation: State Ed. Dept.
Electrical technology, electronics technology, nursing, chemical technology, drafting technology, mechanical technology

Kent County Vocational Technical School, Woodside
Public
Instrument technology, electronics technology, laboratory technology, computer technology, horticulture technology

Sussex County Vocational-Technical Center, Georgetown
Public. W. C. Utz, chm.
Electronics technology, mechanical technology

DISTRICT OF COLUMBIA

Bell Vocational High School, Hiatt Pl. between Irving St. and Park Rd., NW, Washington
Public
Electronics technology

Capitol Institute of Technology, 3220 16th St., NW, Washington 20010
Private. Henry H. Armsby, pres.
Total enrolment: 600
Technician enrolment: 600
Admission: High-school graduation
Computer technology†, electronic communications technology†, electronic drafting technology†, electronics technology†

FLORIDA

Alachua County Vocational School, 1817 E. University Ave., Gainesville
Public. Joseph G. Wood, dir. voc. ed.
Total enrolment: 3,200
Technician enrolment: 32
Accreditation: State Ed. Dept., SA
Admission: High-school graduation, math background, testing and evaluation by advisory committee
Drafting technology, electrical technology*, electronics technology*

Central Florida Junior College, P. O. Box 1388, Ocala 32670
Public. J. L. Murphy, dean of applied sciences
Total enrolment: 1,200
Technician enrolment: 100
Accreditation: State Ed. Dept., SA

Admission: High-school graduation
Civil technology, electronics technology, nursing, radiological health technology, design drafting technology

CHIPOLA JUNIOR COLLEGE, P. O. Box 232, Marianna
Public. N. L. Haven, pres.
Total enrolment: 944
Technician enrolment: 27
Accreditation: SA
Admission: High-school graduation from approved school and rank in upper 80% of Florida seniors
Electronic data processing technology, electronics technology, drafting and design technology

DAYTONA BEACH JUNIOR COLLEGE, Daytona Beach
Public. E. E. Ek, dir.
Total enrolment: 1,700
Technician enrolment: 240
Accreditation: SA, State Ed. Dept.
Admission: High-school graduation
Civil technology, civil and construction technology, drafting technology*, architectural drafting technology*, electrical technology, electronics technology, drafting and tool design*, mechanical technology, instrumentation*

DIXIE HOLLINS HIGH SCHOOL, 4940 62nd St., N., St. Petersburg 33709
Public. Kenneth Watson, prin.
Total enrolment: 1,889
Technician enrolment: 54
Accreditation: SA
Electronics technology, drafting technology, mechanical drafting technology

DUNEDIN HIGH SCHOOL, Dunedin
Public. H. R. Danford, prin.
Total enrolment: 1,071
Technician enrolment: 95
Accreditation: SA
Automotive technology, drafting technology, electronics technology

EDISON JUNIOR COLLEGE, Fort Myers
Public
Drafting design technology

EMBRY-RIDDLE AERONAUTICAL INSTITUTE, P. O. Box 2411, Daytona Beach 32015
Private. J. R. Hunt, pres.
Total enrolment: 400
Technician enrolment: 290
Accreditation: Federal Aviation Agency
Admission: High-school graduation or equivalent
Aeronautical technology†, drafting technology, aviation maintenance technology, aviation technology, jet propulsion technology

ESCAMBIA COUNTY VOCATIONAL SCHOOL, P. O. Box 1470, Pensacola
Public. E. G. Holly, dir.
Electronics technology*, instrumentation*

FLORIDA AGRICULTURAL AND MECHANICAL UNIVERSITY, Vocational-Technical Institute, Tallahassee
Public. M. S. Thomas, dir.
Total enrolment: 3,000
Technician enrolment: 140
Accreditation: SA
Admission: High-school graduation and SAT
Architectural drafting technology, building construction technology, electrical technology, electronic communications technology, industrial electronic technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, mechanical drafting technology, printing technology

FLORIDA COLLEGE, Temple Terrace 33617
Private. James R. Cope, pres.
Total enrolment: 354
Accreditation: SA
Admission: SAT scores from CEEB
Publications technology, statistical technology, architectural drafting technology, architectural engineering technology, building construction technology, structural engineering and design technology, electrical technology, electronics technology, dental technology, medical laboratory technology, medical technology, nursing, engineering science technology, graphic arts technology, drafting technology, industrial drafting and design technology, mechanical drafting technology

GEORGE T. BAKER AVIATION SCHOOL, 3275 N.W. 42nd Ave., Miami 33142
Public. W. F. Smith, supv.
Total enrolment: 600
Technician enrolment: 600
Accreditation: SA
Admission: In top 50 percentile of high-school graduating class in all subject areas
Aviation maintenance technology**

GULF COAST JUNIOR COLLEGE, Panama City
Public. R. E. Morley, pres.
Total enrolment: 1,025
Technician enrolment: 100
Accreditation: SA
Admission: High-school graduation
Architectural drafting technology, electronic communications technology, nursing

HAMPTON JUNIOR COLLEGE, 1214 N. W. 16th Ave., Ocala
Public. Lawrence J. Walker, dir. of voc., tech., and ad. ed.
Total enrolment: 750
Technician enrolment: 50
Accreditation: State Ed. Dept.
Admission: High-school graduate with special courses in math and science
Building construction technology, electrical technology, electronics technology, airconditioning, heating, and refrigeration technology, drafting technology, industrial drafting and design technology

HILLSBOROUGH HIGH SCHOOL, 500 Central Ave., Tampa
Public. W. A. Hamilton, asst. prin.
Electronics technology

INDIAN RIVER JUNIOR COLLEGE, 3209 Virginia Ave., Fort Pierce
Public. Harold H. Hopper, dean of spec. programs
Total enrolment: 618
Technician enrolment: 45
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology, electronics technology, citrus technology

JUNIOR COLLEGE OF BROWARD COUNTY, 3501 Davie Road, SW, Ft. Lauderdale 33314
Public. E. F. Kotchi, dir., tech. ed.
Total enrolment: 3,393
Technician enrolment: 389
Accreditation: State Ed. Dept., SA
Admission: High-school graduation plus ability to do college level work
Civil and construction technology, electronic data processing technology, drafting technology, electronics technology, nursing, graphic arts technology, horticultural technology

LAKE CITY JUNIOR COLLEGE AND FOREST RANGER SCHOOL, Route 1, Lake City
Public. Herbert B. Attaway, Jr., dean, occupational div.
Total enrolment: 450
Technician enrolment: 130
Accreditation: State Ed. Dept.
Admission: Top 150 on Grade Placement Test and/or other tests administered at college proper
Forest technology, civil engineering technology, nursing

LAKE-SUMTER JUNIOR COLLEGE, Leesburg
Public. Marvin M. Jones, div. chm. of tech.-voc. ed.
Total enrolment: 690
Technician enrolment: 5
Accreditation: State Ed. Dept.
Admission: High-school graduation
Architectural drafting technology, design technology, drafting technology, industrial drafting and design technology

LINDSEY HOPKINS EDUCATIONAL CENTER, 1410 N.E. 2nd Ave., Miami 32
Public
Chemical and metallurgical technology*, data processing*, electronics technology**, mechanical technology*

LIVELY TECHNICAL SCHOOL, Tallahassee
Public
Chemical technology

Lyman High School, Longwood
Public
Electronics technology

Manatee Junior College, Bradenton
Public. B. R. Tinsley, Jr., dir., tech. ed.
Total enrolment: 1,674
Technician enrolment: 110
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, 3 yrs. math., satisfactory scores on aptitude and abilities test, and interview
Electronics technology, civil engineering technology, building construction technology, design drafting technology, industrial and business management

Mary Karl Vocational Division, Daytona Beach Junior College, P. O. Box 1111, Daytona Beach
Public. Hal Massey, dir.
Total enrolment: 1,037
Technician enrolment: 78
Accreditation: SA
Admission: Minimum age of 16
Electronic technology, industrial electronic technology

Massey Technical Institute, 148 E. 7th St., Jacksonville
Private. C. A. Barringer, pres.
Total enrolment: 400
Technician enrolment: 400
Admission: High-school graduation
Electronic data processing technology, drafting technology, architectural drafting technology, electronic technology**, industrial electronics technology, electronic communications technology, electronic drafting technology, industrial illustration technology

Miami Central Senior High School, 1781 N.W. 95 Street, Miami
Public. T. Carter, prin.
Total enrolment: 1,520
Technician enrolment: 700
Accreditation: SA, State Ed. Dept.
Admission: Varies for programs
Airconditioning and heating technology, electronic data processing technology, drafting technology, electronics technology, mechanical technology, commercial design technology, architectural drafting technology, computer technology, aviation technology, design technology

Miami-Dade Junior College, 11380 N.W. 27 Avenue, Miami
Public. George Mehallis, dir.
Total enrolment: 13,500
Technician enrolment: 2,600
Accreditation: State Ed. Dept., SA
Admission: High-school graduation and selective test scores
Airconditioning and heating technology, civil technology, electronic data processing technology, drafting technology, architectural drafting technology, instrumentation technology, building construction technology, construction technology, highway technology, structural engineering and design technology, surveying technology, computer technology*, electronics technology, industrial electronic technology*, nursing**, sanitary engineer technology, graphic arts technology**, aviation technology, hydraulics technology*, industrial illustration technology, mechanical drafting technology*, mechanical technology

Mid-Florida Technical Institute, Orlando
Public
Electronics technology

Northeast Senior High School, 700 N. E. 56th St., Fort Lauderdale 33308
Public. Fred Huff, prin.
Electronics technology

North Florida Junior College, Madison
Public. M. Hamilton, pres.
Total enrolment: 721
Technician enrolment: 33
Accreditation: State Ed. Dept., SA
Admission: Graduation from an accredited high school
Electronic data processing technology, highway technology

Okaloosa-Walton Junior College, Valparaiso
Public. Kenneth Gordon, coord.
Electronics technology, design drafting technology

Orange County Vocational School, 325 N. Palmetto Ave., Orlando
Public. J. R. Leach, prin.
Total enrolment: 700
Technician enrolment: 300
Accreditation: State Ed. Dept.
Admission: Standard vocational
Automotive technology, aeronautical technology, drafting technology, architectural drafting technology, electrical technology*, electronics technology**

Palm Beach County Vocational School, West Palm Beach
Public
Electronics technology

Palm Beach Junior College, 4200 Congress Ave., Lake Worth
Public. D. C. Whitmer, chm., eng. tech. dept.
Total enrolment: 3,100
Technician enrolment: 100
Accreditation: SA
Admission: High-school graduation
Drafting technology, architectural drafting technology**, electronics technology**, machine drafting and design

Pensacola Junior College, 1000 College Blvd., Pensacola 32504
Public. Herman A. Heise, vice-pres. for degree program
Total enrolment: 3,500
Technician enrolment: 175
Accreditation: SA and State Ed. Dept.
Admission: High-school graduation and minimum admission scores on SCAT
Drafting technology, electronics technology, data processing technology, architectural drafting technology, computer technology, electro-mechanical drafting technology, industrial electronic technology, dental technology, nursing

Polk County Junior College, Bartow Airport, Bartow
Public. James E. Harris, dir.
Chemical technology, drafting technology, mining technology, food-processing technology

St. Johns River Junior College, Palatka
Public. Harmon R. Fowler, dir. of tech. ed.
Total enrolment: 1,800
Technician enrolment: 150
Accreditation: SA
Admission: High-school graduation
Data processing technology**, civil technology, electronics technology, design technology, drafting technology

St. Petersburg Junior College, Technical Division, 5th Ave. and 66th St., N., St. Petersburg 33710
Public. W. L. Bolin, dean of tech. ed.
Total enrolment: 4,500
Technician enrolment: 250
Accreditation: SA
Admission: High-school graduation
Electronics technology†, mechanical design technology

Tampa Technical College, Inc., 3347 Henderson Blvd., Tampa
Private. A. Jank, pres.
Total enrolment: 300
Technician enrolment: 300
Admission: High-school graduation
Electronic data processing technology**, drafting technology, electronics technology**, industrial electronic technology**, drafting and tool design

Tampa Technical Institute, 209 N. Franklin St., Tampa
Private. E. Begue, pres.
Total enrolment: 70
Technician enrolment: 70
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology, electronics technology, industrial electronic technology, architectural drafting technology, structural engineering and design technology, computer technology, commercial

broadcast technology, electro-mechanical drafting technology, electronic communications technology, electronic drafting technology, industrial drafting and design technology, industrial illustration technology, mechanical drafting technology

Tomlinson Adult Education Center, 296 Mirror Lake Dr., St. Petersburg
Public. J. C. Hill, prin.
Total enrolment: 421
Technician enrolment: 37
Admission: 17 yrs. or older, passing of GATB tests, high-school graduation necessary for some courses, tenth grade necessary for others
Drafting technology**, electronics technology**

Volusia County Community Junior College, Daytona Beach
Public. J. G. Green, pres.
Technician enrolment: 55
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology, mechanical design technology, electrical technology

Washington Junior College, Pensacola
Public
Chemical technology, electronics technology

GEORGIA

Abraham Baldwin Agricultural College, Tifton
Public. J. Clyde Driggers, pres.
Total enrolment: 1,024
Technician enrolment: 192
Accreditation: SA
Admission: High-school graduation, C or better average
Agri-business technology, data processing technology, agricultural equipment technology

Albany Area Vocational-Technical School, 1800 South Slappey Drive, Albany
Public. H. D. Waters, dir.
Total enrolment: 950
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, satisfactory GATB score
Electrical technology, electronics technology, mechanical technology, commercial design technology*, computer technology*

Athens Area Vocational Technical School, 419 Pope St., Athens
Public. R. G. Shelnutt, dir.
Total enrolment: 740
Technician enrolment: 110
Admission: High-school graduation and satisfactory scores on US employment test
Electronics technology**

Augusta Area Vocational-Technical School, 2025 Lumpkin Rd., Augusta
Public. G. Hardy, dir., B. Brewton, asst. dir.
Total enrolment: 600
Technician enrolment: 200
Accreditation: State Ed. Dept.
Admission: Interview by director and instructor, passing aptitude test
Drafting technology**, electrical technology**, electronics technology**, highway technology**, instrumentation technology**

Brunswick College, Brunswick
Public. Earl F. Hargett, pres.
Total enrolment: 296
Admission: High-school graduation, SAT scores with 700 combined total min.
Chemical technology

Columbus Area Vocational-Technical School, 4460 River Road, Columbus 31904
Public. A. Perry Gordy, dir.
Total enrolment: 250
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation, minimum of 1 yr. of math and 1 yr. of science, satisfactory score on GATB
Electronics technology, mechanical design technology, mechanical technology

Columbus College, Columbus 31907
Public. Thomas Y. Whitley, pres.
Total enrolment: 959
Technician enrolment: 12
Accreditation: SA
Admission: High-school graduation, satisfactory CEEB SAT scores
Data processing technology (1966), medical laboratory technology

Coosa Valley Area Vocational-Technical School, 112 Hemlock St., Rome
Public. C. M. Culberson, dir.
Total enrolment: 426
Technician enrolment: 128
Accreditation: State Ed. Dept.
Admission: High-school graduation, satisfactory score on aptitude and achievement tests
Drafting technology**, electrical technology**, electronics technology**, mechanical and production engineering technology**

DeKalb Area Technical School, 495 North Indian Creek Rd., Stone Mountain
Public. P. J. Lowery
Total enrolment: 600
Technician enrolment: 300
Accreditation: State Ed. Dept.
Admission: High-school graduation, acceptable scores on the GATB, prerequisite courses in math and science
Electronic data processing technology**, electrical technology**, electronics technology**, mechanical technology**, chemical technology**, computer technology*, electronic communications technology*, electronic drafting technology*, industrial electronic technology*, metallurgical technology*, airconditioning, heating, and refrigeration technology**, auto-diesel technology*, automotive technology*, design technology*, drafting technology*, fluid power (engineering) technology*, hydraulics technology*, industrial drafting and design technology*, machine tool technology*, mechanical and production engineering technology*, mechanical drafting technology*

Dudley Hughes Vocational School
Macon
Public
Electronics technology

Griffin-Spalding County Area Vocational Technical School, P. O. Box 131, Griffin
Public. Edwin V. Langford, Sr., dir.
Total enrolment: 150
Technician enrolment: 30
Admission: High-school graduation, qualifying score on GATB
Electronics technology**, mechanical drafting technology**

Hoke Smith Technical School, 535 Hill St., S.E., Atlanta 12
Public. Dea O. Pounders, act. dir.
Total enrolment: 2,490
Technician enrolment: 40
Admission: High-school graduation or equivalent
Commercial design technology, data processing technology, electrical technology, electronics technology**, industrial electronic technology*, dental technology*, medical technology*, nursing*, lithographic technology*, textile engineering technology*, airconditioning, heating, and refrigeration technology**, automotive technology**, drafting technology, industrial drafting and design technology, industrial illustration technology, machine tool technology**, mechanical technology, food-processing technology*

Marietta-Cobb Area Vocational-Technical School, 210 South Cobb Drive, Marietta
Public. William T. Bodenhamer, Jr., dir.
Total enrolment: 740
Technician enrolment: 120
Accreditation: State Ed. Dept.
Admission: High-school graduation, qualifying score on GATB

Electrical technology, electronics technology, mechanical technology, data processing technology**, architectural drafting technology

MIDDLE GEORGIA COLLEGE, Cochran
Public. Louis C. Alderman, Jr., pres.
Total enrolment: 1,102
Technician enrolment: 15
Accreditation: SA
Drafting and surveying technology

MONROE AREA VOCATIONAL-TECHNICAL SCHOOL, Albany
Public. B. White, dir.
Total enrolment: 254
Technician enrolment: 26
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, passing of entrance examination
Electronics technology

MOULTRIE AREA VOCATIONAL-TECHNICAL SCHOOL, P. O. Box 399, Moultrie 31768
Public. W. W. Hobbs, Jr., dir.
Total enrolment: 185
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation or GEDT certificate and qualifying score on GATB
Electronics technology**, design technology**, drafting technology**

MUSCOGEE AREA VOCATIONAL-TECHNICAL SCHOOL, Courtland Ave., Route 2, Columbus
Public. J. H. Smith, dir.
Total enrolment: 147
Technician enrolment: 13
Accreditation: State Ed. Dept.
Admission: High-school graduation, 18 yrs. or older
Electronics technology

NORTH GEORGIA TECHNICAL AND VOCATIONAL SCHOOL, Clarkesville
Public. H. O. Carlton, dir.
Total enrolment: 1,007
Technician enrolment: 268
Accreditation: State Ed. Dept., ASCP
Admission: High-school graduation, acceptable GATB scores
Electronics technology, data processing technology, building construction technology*, highway technology*, electrical technology*, medical laboratory technology, design technology, airconditioning, heating, and refrigeration technology

SAVANNAH VOCATIONAL SCHOOL, 214 W. Bay Street, Savannah
Public. J. Lytjen, dir.
Total enrolment: 2,500
Technician enrolment: 150
Admission: High-school graduation or GEDT equivalent
Electronics technology**

SMITH-HUGHES VOCATIONAL SCHOOL, 232 Pryor Street, SW, Atlanta
Public. R. E. Hagen, supv.
Electronics technology, instrumentation, mechanical design technology

SOUTH GEORGIA COLLEGE, Douglas
Public. Pope A. Duncan, pres.
Total enrolment: 700
Technician enrolment: 30
Accreditation: SA
Admission: High-school graduation—C average or better, SAT
Medical laboratory technology, nursing

SOUTH GEORGIA TECHNICAL AND VOCATIONAL SCHOOL, Americus
Public. H. P. Odom, dir.
Total enrolment: 500
Technician enrolment: 200
Admission: High-school graduation or equivalent, 18 yrs. or older, personal interview
Aeronautical technology, automotive technology, electrical technology, electronics technology, mechanical technology, diesel technology

SOUTHERN TECHNICAL INSTITUTE, Clay Street, Marietta 30061
Public. H. L. McClure, dir.
Total enrolment: 1,200
Technician enrolment: 1,200
Accreditation: SA
Admission: SAT (CEEB), high-school graduation with 4 units of English, 3 units of math, and 2 units science
Architectural engineering technology†, civil engineering technology†, electrical engineering technology†, textile engineering technology, airconditioning engineering technology†, industrial engineering technology†, mechanical engineering technology†, gas engineering technology†

THOMAS AREA VOCATIONAL-TECHNICAL SCHOOL, Thomasville
Public. P. Sewell, dir.
Total enrolment: 99
Admission: High-school graduation, satisfactory score on GATB test, satisfactory rating by screening committee as a result of interview
Electronics technology

UPSON COUNTY AREA VOCATIONAL-TECHNICAL SCHOOL, Box 6, Thomaston
Public. E. G. McCants, dir.
Total enrolment: 300
Technician enrolment: 32
Accreditation: State Ed. Dept.
Admission: High-school graduation and pass entrance test
Highway technology*, electronics technology

VALDOSTA AREA VOCATIONAL-TECHNICAL SCHOOL, Rt. 1, Box 211, Valdosta
Public. Lamar Holloway, dir.
Total enrolment: 150
Technician enrolment: 50
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electrical technology**, electronics technology**, nursing, mechanical drafting technology

WALTON AREA VOCATIONAL-TECHNICAL SCHOOL, 401 Wolfe St., Thomasville
Public. Edward H. Smith, dir.
Total enrolment: 168
Accreditation: State Ed. Dept.
Admission: High-school graduation, satisfactory score on GATB test, satisfactory rating by screening committee as a result of interview
Building construction technology, automotive technology

WAYCROSS AREA VOCATIONAL-TECHNICAL SCHOOL, Waycross
Public. R. Hartley, dir.
Electronics technology

HAWAII

CHURCH COLLEGE OF HAWAII, Laie
Private. Owen J. Cook, pres.
Total enrolment: 942
Technician enrolment: 153
Accreditation: WA
Admission: High-school graduation
Automotive technology, metallurgical technology, building construction technology, electronic communications technology

HAWAII TECHNICAL SCHOOL, P. O. Box 1457, Hilo
Public. H. Watanabe, prin.
Total enrolment: 300
Technician enrolment: 23
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology, architectural drafting technology

HONOLULU TECHNICAL SCHOOL, 874 Dillingham Blvd., Honolulu 96817
Public. J. W. Nothom, prin.
Total enrolment: 725
Technician enrolment: 135
Accreditation: State Ed. Dept.
Admission: High-school graduation, satisfactory school record, satisfactory test scores
Civil technology, architectural drafting technology, electronics technology

IDAHO

BOISE JUNIOR COLLEGE, Boise
Public
Electronics technology, civil technology,

mechanical drafting and design technology

Idaho State University, School of Trade and Technical Education, Tenth and Terry, Pocatello
Public. Jack L. Rucker, dir.
Total enrolment: 4,300
Technician enrolment: 600
Accreditation: NWA
Admission: GATB
Soils technology, civil technology, electronics technology, instrumentation technology**, industrial drafting and design technology**

Lewiston Independent School District No. 1, Lewiston
Public. A. L. Smith, supt.
Total enrolment: 5,500
Technician enrolment: 210
Accreditation: NWA
Automotive technology, electrical technology

North Idaho Junior College, Coeur d'Alene
Public. P. A. Christianson, pres.
Total enrolment: 744
Technician enrolment: 72
Accreditation: NWA
Admission: High-school graduation or equivalent
Architectural drafting technology, electromechanical technology, industrial electronic technology, automotive technology, industrial drafting and design technology

Ricks College, Rexburg 83440
Private. John L. Clarke, pres.
Total enrolment: 1,872
Accreditation: NWA
Admission: High-school graduation; over 19 yrs. old with less than high-school graduation under special permission
Building construction technology, electronic communications technology, industrial electronic technology, nursing, automotive technology, drafting technology, welding technology

ILLINOIS

Aero-Space Institute, 116 S. Michigan Ave., Chicago 60603
Private. Alfred F. Stott, pres.
Total enrolment: 45
Technician enrolment: 12
Accreditation: State Ed. Dept.
Admission: High-school graduation, 1 yr. algebra, 1 yr. science
Aeronautical and astronautical (engineering) technology, drafting technology

Allied Institute of Technology, 1338 South Michigan Ave., Chicago 5
Private. H. Lebeson, pres.
Total enrolment: 2,199
Technician enrolment: 903
Accreditation: State Ed. Dept.
Admission: Four years of high school or equivalent in industrial experience
Automotive technology**, airconditioning and heating technology**, drafting technology**, industrial technology**, machine tool technology**, design technology**, industrial drafting and design technology**, mechanical and production engineering technology**, mechanical drafting technology**

Belleville Junior College, Belleville
Public. K. L. Edwards, dean
Accreditation: NCA, State Ed. Dept
Admission: High-school graduation
Architectural and civil technology, chemical technology, electrical technology, electronics technology, engineering technology, industrial technology

Black Hawk College, 1001 16th Street, Moline 61265
Public. R. E. Whalen, pres.
Total enrolment: 2,200
Technician enrolment: 150
Accreditation: NCA
Admission: High-school graduation, GEDT
Electronics technology**, mechanical technology**

Bloom Community College, Dixie Highway at 10th St., Chicago Heights
Public. A. Martin, dean
Total enrolment: 1,147
Technician enrolment: 65
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electronic communications technology**, industrial electronic technology**, mechanical and production engineering technology**, mechanical drafting technology**

Canton Community College, 1001 North Main Street, Canton 61520
Public. Edwin Fitzgibbon, dean of tech. ed.
Total enrolment: 530
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: High-school graduation, GATB
Agricultural machine technology, civil technology, highway technology

Central YMCA Community College, 19 South LaSalle Street, Chicago 60603
Private. D. A. Canar, exec. dean
Total enrolment: 2,500
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: High-school graduation or pass GED exams
Electronic data processing technology

Chicago City Junior College, Bogan Branch, 3939 W. 79th Street, Chicago
Public. H. C. Klopp, asst. dean
Chemical technology

Chicago City Junior College, Fenger Branch, 11220 S. Wallace, Chicago
Public. H. C. Klopp, asst. dean
Chemical technology, engineering technology

Chicago City Junior College, Loop Branch, 64 E. Lake St., Chicago
Public. E. Clements, dean
Total enrolment: 5,176
Technician enrolment: 285
Accreditation: NCA
Admission: Graduation from accredited high school
Electronic data processing technology

Chicago City Junior College, Southeast Branch, 2100 E. 87th St., Chicago
Public. J. F. Grede, dean; C. Pachucki, asst. dean
Total enrolment: 3,000
Technician enrolment: 349
Accreditation: NCA
Admission: High-school graduation with ability in science and math
Electronics technology**, data processing technology**, civil technology**, highway technology**, structural engineering and design technology**, surveying technology**, computer technology**, industrial electronic technology**, chemical technology**, instrumentation technology**, metallurgical technology**, design technology**, mechanical drafting technology**, mechanical technology**, prosthetics technology**

Chicago City Junior College, Wright Branch, 3400 N. Austin Ave., Chicago
Public. O. E. Shabat, dean
Total enrolment: 8,118
Technician enrolment: 41
Accreditation: NCA
Admission: High-school graduation or 21 yrs. or older
Drafting technology, architectural drafting technology, electronics technology, drafting and tool design, machine drafting and design, mechanical design technology, fundamental strength of metals and design

Chicago Technical College, 2000 South Michigan Avenue, Chicago 16
Private. L. G. Morey, pres.
Total enrolment: 1,293
Technician enrolment: 297
Accreditation: State Ed. Dept.
Admission: High-school graduation with credits in math, science, and mechanical drawing
Civil technology, electrical technology, architectural technology, mechanical technology

Community High School, District 123, 1717 17th St., North Chicago 60064
Public. W. Snodgrass, supv.
Total enrolment: 1,175
Accreditation: State Ed. Dept.
Admission: Series of tests
Electronic data processing technology*†, computer technology*†, hydraulics technology*†

Danville Junior College, Jackson and Fairchild, Danville
Public. M. Miller, dean; M. W. Milgate, dir., tech. ed.
Total enrolment: 500
Technician enrolment: 40
Accreditation: NCA
Admission: High-school graduation or equivalent with a minimum of two yrs. high-school mathematics
Electronic data processing technology**, mechanical design technology

Decatur Public Schools, 101 West Cerro Gordo, Decatur
Public. Delbert L. Young, coord. post-high ed.
Total enrolment: 5,000
Technician enrolment: 48
Accreditation: NCA
Admission: High-school graduation with two yrs. of high-school math
Electronic data processing technology, electronics technology

DeVry Technical Institute, 4141 Belmont Avenue, Chicago 60641
Private. T. J. Lafeber, pres.
Total enrolment: 2,875
Technician enrolment: 2,875
Admission: High-school graduation
Computer technology*†, commercial broadcast technology*†, electronic communications technology*†, electronic drafting technology†, electronics technology†, industrial electronic technology*†, instrumentation technology*†

Dunbar Vocational High School, 3000 South Park Way, Chicago 16
Public. J. J. Dixon, prin.
Total enrolment: 2,165
Technician enrolment: 11
Accreditation: NCA
Admission: High-school graduation with 1 yr. physics, 2 yrs. drafting, 2½ yrs. math
Aviation electronic technology

East Alton-Wood River Area Technical Institute, 777 N. Wood River Ave., Wood River
Public. W. G. Stevenson, dir.
Total enrolment: 1,460
Technician enrolment: 11
Accreditation: NCA, State Ed. Dept.
Admission: High-school graduation or equivalent with basic math and science background
Industrial electronic technology

Freeport Community College, Corner Locust and Empire Sts., Freeport
Public. Burton B. Brackney, dean
Total enrolment, 600
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: Graduation from accredited high school or equivalent, 2 yrs. math
Drafting technology*, electronics technology, mechanical technology, data processing technology*, electronic drafting technology*, industrial electronic technology, chemical technology, metallurgical technology*, industrial drafting and design technology*, mechanical and production engineering technology, mechanical drafting technology*

Institute of Aviation, University of Illinois, 318 Civil Engineering Hall, Urbana 61803
Public. L. A. Bryan, dir.
Total enrolment: 25,537
Technician enrolment: 98
Accreditation: NCA
Admission: Varies according to technology
Aviation electronic technology†, aviation maintenance technology†

Joliet Junior College, 201 East Jefferson Street, Joliet
Public. E. H. Frost, dir. tech. ed.
Total enrolment: 2,000
Technician enrolment: 250
Accreditation: NCA
Admission: High-school diploma or GEDT or over 21 yrs.
Automotive technology, airconditioning and heating technology*, electronic data processing technology, drafting technology*, electrical technology, electronics technology**, drafting and tool design, agri-business technology, industrial electronic technology, design technology, machine tool technology, mechanical drafting technology

LaSalle-Peru-Oglesby Junior College, Fifth and Chartres Street, LaSalle
Public. F. H. Dolan, dir.
Total enrolment: 517
Technician enrolment: 62
Accreditation: NCA
Admission: High-school graduation, upper half of graduating class, and strong interest in technical field
Electronic data processing technology, electronics technology

Lewis College Technical Institute, Highway 66A, Lockport
Private. Brother Vincent Neil, dir.
Total enrolment: 800
Technician enrolment: 80
Admission: High-school graduation
Aviation maintenance technology

Morton Junior College, 2423 South Austin Blvd., Cicero 60650
Public. H. J. White, dean
Total enrolment: 2,150
Technician enrolment: 233
Accreditation: NCA
Admission: High-school graduation with 2 yrs. of math
Electronics technology, data processing technology, nursing

Peoria College of Bradley University, Peoria
Private. W. W. Grimm, dean
Total enrolment: 241
Technician enrolment: 67
Accreditation: NCA
Admission: Accepted high-school record, satisfactory SATB scores, 2 units high-school math and 2 units high-school science
Electronics technology, building construction technology, machine design technology, metal technology, engine power technology

Peoria Public Schools, 3202 N. Wisconsin Ave., Peoria
Public. Roland W. Sanders, dir.
Computer technology

Proviso East High School, 807 S. 1st Ave., Maywood
Public. Hubert Pitt, prin.
Total enrolment: 3,500
Accreditation: NCA
Data processing technology, computer technology, electronics technology*, nursing*, metallurgical technology*, design technology*, drafting technology*, hydraulics technology*, mechanical drafting technology*

Rockford Board of Education, Rockford
Public
Electronic data processing technology, mechanical drafting and design technology

Rockford Technical Institute, 201 S. Madison St., Rockford
Public. J. E. Fortin, dir.
Total enrolment: 536
Technician enrolment: 536
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent with 2 yrs. of math
Airconditioning and heating technology*, electronic data processing technology**, drafting technology*, industrial technology*, metallurgical technology*, computer technology*, electrical technology*, electronics technology*, instrumentation technology*, design technology*, hydraulics technology*, industrial drafting and design technology, mechanical drafting technology*

Southern Illinois University, Vocational Technical Institute, Carbondale
Public. E. J. Simon, dean
Total enrolment: 1,201

Technician enrolment: 522
Accreditation: NCA
Admission: Graduation from accredited high school or pass GEDT
Automotive technology, electronic data processing technology, architectural drafting technology, electronics technology, machine tool technology, building construction technology, commercial design technology, dental technology, nursing, graphic arts technology, aviation maintenance technology, drafting technology, industrial drafting and design technology, industrial illustration technology, industrial wood technology

Steel Institute of Granite City, 3101 Madison Ave., Granite City
Public. M. A. Wittevrongel, adm. asst.
Total enrolment: 664
Technician enrolment: 664
Admission: High-school graduation or equivalent
Steel making technology*

Thornton Junior College, 151st and Broadway, Harvey
Public. H. D. Roberts, dir. tech. ed.
Total enrolment: 2,025
Technician enrolment: 371
Accreditation: NCA
Admission: High-school graduation or satisfactory test scores on GEDT
Industrial electronic technology, computer technology*, design technology, drafting technology, tool and die design technology

Triton College, 1000 Wolf Rd., Northlake
Public. Herbert Zeitlin, pres.
Total enrolment: 800
Technician enrolment: 400
Accreditation: State Ed. Dept.
Admission: High-school graduation or 21 yrs. of age or older
Data processing technology, surveying technology, electronic-drafting technology

United Township Technical Institute, 1420 18th Avenue, East Moline
Public. L. F. Vines, dir., ind. and tech. ed.
Total enrolment: 76
Technician enrolment: 76
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Industrial electronic technology, drafting and tool design technology

Wabash Valley College, Mt. Carmel
Public. C. Edwin Pearson, dean
Total enrolment: 612
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: High-school graduation or 18 yrs. of age or older
Electronics technology**, agri-business technology**, agricultural mechanical technology**, data processing technology*, publications technology*, architectural drafting technology*, building construction technology*, nursing

Waukegan Township High School, 1011 W. Washington Ave., Waukegan
Public. A. O. Remde, dir.
Total enrolment: 1,850
Technician enrolment: 108
Admission: High-school graduation or equivalent, 18 yrs. or older, 1 yr. high-school math and 1 yr. high-school physical science
Electronic data processing technology, electronics technology**, chemical technology**, general engineering technology**, nursing

INDIANA

Bedford High School, 1501 N. St., Bedford
Public. Elmar Dunbar, prin.
Total enrolment: 1,940
Accreditation: NCA
Electronics technology, automotive technology, machine tool technology

Bloomington Senior High School, 1965 S. Walnut St., Bloomington
Public: C. G. Taylor, asst. prin.
Total enrolment: 550
Technician enrolment: 400
Accreditation: NCA
Admission: High-school graduation
Electronics technology, industrial technology, soils technology, architectural drafting technology, building construction technology, construction technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology

Evansville College, Box 329, Evansville 47704
Private. Melvin W. Hyde, prin.
Total enrolment: 2,475
Technician enrolment: 140
Accreditation: NCA
Admission: Upper 50% of class and SAT scores
Medical technology, nursing

Evansville-Vanderburgh School Corporation, 200 N.W. Seventh St., Evansville
Public. Russel J. Rowen, dir.
Total enrolment: 4,533
Technician enrolment: 1,015
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Architectural drafting technology**, electronics technology**, nursing, graphic arts technology**, airconditioning, heating, and refrigeration technology*, automotive technology**, combustion power technology**, design technology**, drafting technology, hydraulics technology*, industrial drafting and design technology**, machine tool technology**, mechanical drafting technology**

Fort Wayne Community School, Vocational Adult Evening School, Fort Wayne
Public. J. Bobay, voc. dir.
Total enrolment: 5,250
Technician enrolment: 1,021
Accreditation: State Ed. Dept.
Admission: Ability to profit from the instruction
Airconditioning and heating technology*, drafting technology*, electrical technology*, electronics technology*, industrial electronic technology*, drafting and tool design*, machine tool technology*, architectural drafting technology*, electronic communications technology*, industrial electronic technology*, dental technology*, nursing*, graphic arts technology*, automotive technology*, mechanical drafting technology*

Lain Technical Institute, 601 North Delaware St., Indianapolis; and 820 E. Division St., Evansville
Private. David W. Lain, dir.
Total enrolment: 250
Technician enrolment: 250
Admission: High-school graduation and satisfactory completion of entrance tests
Architectural engineering technology, industrial engineering technology**, tool and design technology**

Marion Community Schools, Box 1089, Marion
Public. Walter J. Tucker, voc. dir.
Total enrolment: 10,000
Technician enrolment: 41
Accreditation: NCA, State Ed. Dept.
Admission: High-school graduation
Electronics technology, nursing

Purdue University, Extension Center, Fort Wayne
Public
Electronic data processing technology

Purdue University, Extension Center, Gary
Public
Electronic data processing technology

Purdue University, Extension Center, Indianapolis
Public
Electronic data processing technology

Purdue University, School of Technology, Lafayette
Public. C. H. Lawshe, dean
Total enrolment: 22,000
Technician enrolment: 1,300
Admission: High-school graduation, upper ⅔ of class, CEEB

Data processing technology, architectural engineering technology, civil technology, aviation electronics technology, computer technology, electrical technology, industrial electronic technology, nursing, chemical technology, graphic arts technology, instrumentation technology, metallurgical technology, air-conditioning, heating, and refrigeration technology, aviation maintenance technology, aviation technology, industrial illustration technology, industrial technology, mechanical technology, general aviation flight technology

ST. MARGARET HOSPITAL, 25 Douglas St., Hammond
Private. Sister M. Alphonsetta, RRL, dir.
Technician enrolment: 6
Accreditation: Joint Commission on Accreditation of Hospitals
Admission: High-school graduation
Medical records technology

SAMS TECHNICAL INSTITUTE, INC., 1720 E. 38th St., Indianapolis 46218
Private. W. D. Renner, dir.
Total enrolment: 800
Admission: High-school graduation
Electronics engineering technology, electronics technology, architectural engineering technology, tool engineering technology, industrial engineering technology

SOUTH BEND COMMUNITY SCHOOL CORPORATION, Adult Education Division, 1534 W. Sample St., South Bend
Public. Robert C. Riley, dir.
Total enrolment: 3,000
Technician enrolment: 300
Admission: High-school graduation or equivalent and satisfactory completion of entrance tests
Data processing technology, electronics technology*, design technology*, industrial technology*, mechanical technology*

TRI-STATE COLLEGE, Angola
Private. R. M. Bateman, pres.
Total enrolment: 1,720
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: High-school graduation, 2 yrs. math, 1 yr. physics
Industrial drafting and design technology

VALPARAISO TECHNICAL INSTITUTE, Valparaiso
Public. E. Hershman, pres.
Total enrolment: 325
Technician enrolment: 325
Admission: High-school graduation, 1 yr. math, upper ¾ graduating class
Electronics technology, electronic engineering technology†

VIGO COUNTY SCHOOL CORPORATION, Voc.-Tech. Adult Ed. Center, Terre Haute
Public
Electrical technology*, electronics technology*, mechanical technology*

VINCENNES UNIVERSITY, Vincennes
Public. J. H. Hill, dean
Total enrolment: 971
Technician enrolment: 125
Accreditation: NCA
Admission: High-school graduation
Electrical technology, drafting technology, electronic data processing technology, publications technology, aviation electronics technology, computer technology, medical laboratory technology, medical records technology, nursing, graphic arts technology, automotive technology, aviation maintenance technology

IOWA

BURLINGTON COMMUNITY COLLEGE, 1308 Valley St., Burlington 52601
Public. R. A. St. Clair, dir.
Total enrolment: 600
Technician enrolment: 100
Accreditation: NCA
Admission: High-school graduation or equivalent
Electronics technology, electronic drafting technology, industrial electronic technology, nursing, design technology, industrial drafting and design technology, industrial technology, mechanical and production engineering technology, mechanical technology

CEDAR RAPIDS AREA VOCATIONAL TECHNICAL SCHOOL, 346 Second Avenue, SW, Cedar Rapids
Public. G. W. Eddings, dir. voc.-tech. ed.
Total enrolment: 40
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, test battery
Data processing technology, electronics technology, drafting technology, machine tool technology

CENTERVILLE COMMUNITY COLLEGE, Centerville
Public. L. Hellyer, dean
Total enrolment: 353
Technician enrolment: 55
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology, industrial electronic technology, design technology, drafting technology, nursing

CHARLES CITY COMMUNITY SCHOOL DISTRICT, Charles City
Public
Electronics technology

CLARINDA COMMUNITY COLLEGE, Clarinda
Public. L. J. Sonneman, dean
Total enrolment: 218
Technician enrolment: 13
Accreditation: Iowa State U.
Admission: High-school graduation
Drafting and tool design, machine drafting and design**, machine tool technology**, mechanical design technology, mechanical technology

CLINTON JUNIOR COLLEGE, Clinton
Public. P. B. Sharar
Total enrolment: 245
Accreditation: State Ed. Dept.
Admission: 1½ yrs. of algebra
Electronics technology

DAVENPORT AREA TECHNICAL SCHOOL, 1001 Harrison St., Davenport
Public. A. M. Sarchett, dir.
Total enrolment: 180
Technician enrolment: 180
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, upper ½ of class
Electronics technology, mechanical technology, data processing technology, medical laboratory technology, nursing

DES MOINES COMMUNITY SCHOOL, 1800 Grand Ave., Des Moines
Public. J. Bell, dir.
Total enrolment: 2,048
Technician enrolment: 190
Accreditation: NCA
Airconditioning and heating technology, electronic data processing technology, industrial electronic technology, machine drafting and design, communications electronics

FORT DODGE COMMUNITY COLLEGE, 2521 10th Ave., N., Fort Dodge
Public. Dale F. Petersen, dir. of ind. ed.
Total enrolment: 630
Technician enrolment: 20
Accreditation: State Ed. Dept.
Admission: Entrance test, varies according to program
Electronics technology*, industrial electronic technology

IOWA STATE UNIVERSITY, Technical Institute, Ames 50010
Public. H. B. Ellis, head, tech. inst.
Total enrolment: 13,000
Technician enrolment: 300
Accreditation: NCA
Admission: High-school graduation from approved school with units of algebra, geometry, physics, and chemistry recommended
Construction technology†, electronics technology†, mechanical technology†, chemical industries technology

IOWA TECHNICAL EDUCATION CENTER, 226 South Benton, Ottumwa

Public. H. L. Norris, dir.
Total enrolment: 263
Technician enrolment: 231
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronic data processing technology**, computer technology**, industrial electronic technology**

MARSHALLTOWN COMMUNITY COLLEGE, 113 N. 1st Ave., Marshalltown 50158
Public. George W. Bowman, dean
Total enrolment: 527
Technician enrolment: 26
Accreditation: State Ed. Dept.
Admission: High-school graduation or special permission
Electronics technology, chemical technology, automotive technology, design and drafting technology, mechanical technology

MASON CITY JUNIOR COLLEGE, 215 S.E. 15th, Mason City
Public. C. Beem, dean
Total enrolment: 1,069
Technician enrolment: 96
Accreditation: NCA
Admission: High-school graduation or equivalent
Electronics technology, nursing, airconditioning, heating, and refrigeration technology, automotive technology, machine design technology

MUSCATINE COMMUNITY COLLEGE, 152 Colorado St., Muscatine
Public. James F. Loper, dean
Total enrolment: 556
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation
Agri-business technology

OTTUMWA COMMUNITY SCHOOL DISTRICT, Ottumwa
Public
Electronics technology, electronic data processing technology

SIOUX CITY BOARD OF EDUCATION, 1221 Pierce St., Sioux City
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Drafting technology, automotive technology*, electrical technology, electronics technology*, industrial technology*, nursing

WATERLOO AREA TECHNICAL SCHOOL, 1516 Washington, Waterloo 50702
Public. D. L. Lippold, dir.
Total enrolment: 90
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology**, mechanical technology, drafting technology*, hydraulics technology*, machine tool technology*

KANSAS

CAMPUS HIGH SCHOOL, 2100 W. 55th Street, S., Wichita 17
Public. D. Ferguson, supt.
Total enrolment: 1,250
Technician enrolment: 40
Accreditation: State Ed. Dept.
Electronic data processing technology**

FORT HAYS KANSAS STATE COLLEGE, Hays
Public. M. C. Cunningham, pres.
Total enrolment: 4,150
Accreditation: NCA, National Council for Accreditation of Teacher Education
Admission: High-school graduation or equivalent
Data processing technology, dental technology, medical laboratory technology, nursing

HUTCHINSON COMMUNITY JUNIOR COLLEGE, 1300 North Plum, Hutchinson
Public. G. W. Koon, dir.
Total enrolment: 1,178
Technician enrolment: 110
Accreditation: NCA
Admission: Satisfactory ACT and GATB scores, high-school graduation or equivalent
Automotive technology, drafting technology, electrical technology, electronics technology, machine tool technology

INDEPENDENCE COMMUNITY COLLEGE, 10th and Oak Street, Independence
Public. F. Cinotto, dean
Total enrolment: 483
Technician enrolment: 45
Accreditation: NCA, State Ed. Dept.
Admission: High-school graduation
Drafting technology, electronics technology, machine tool technology, printing technology

KANSAS CITY KANSAS COMMUNITY JUNIOR COLLEGE, 823 State Ave., Kansas City 66101
Public. Jack M. Flint, dean
Total enrolment: 891
Technician enrolment: 35
Accreditation: NCA and State Ed. Dept.
Admission: High-school graduation or successful scores on battery of tests
Data processing technology, computer technology, drafting technology

KANSAS STATE COLLEGE OF PITTSBURG, Pittsburg
Public. William D. Spence, chm. ind. ed.
Total enrolment: 4,700
Technician enrolment: 62
Accreditation: NCA
Admission: High-school graduation
Drafting technology, data processing technology, architectural drafting technology, electronics technology, graphic arts technology, automotive technology, industrial illustration technology, machine tool technology, wood technology

KANSAS STATE TEACHERS COLLEGE, 1200 Commercial St., Emporia 66802
Public. John E. King, pres.
Total enrolment: 5,600
Accreditation: NCA, National Council for Acc. of Teacher Education
Admission: Graduation from Kansas High School; selective for non-residents
Data processing technology

LABETTE COMMUNITY JUNIOR COLLEGE, 200 S. 14th St., Parsons
Public. C. H. Thiebaud, dean
Total enrolment: 412
Technician enrolment: 38
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Automotive technology, drafting technology, printing technology

LABETTE COUNTY COMMUNITY HIGH SCHOOL, Altamont
Public. H. F. Harrison, supt.
Total enrolment: 900
Technician enrolment: 475
Accreditation: NCA
Electronics technology, agri-business technology, soils technology, architectural drafting technology, architectural engineering technology, surveying technology, nursing, chemical technology, automotive technology, drafting technology, machine tool technology

MCFARLAND TRADE SCHOOL, Coffeyville
Public. W. F. Currier, dir.
Total enrolment: 454
Technician enrolment: 39
Accreditation: State Ed. Dept.
Admission: Aptitude tests
Electronics technology

NORTHWEST KANSAS AREA VOCATIONAL-TECHNICAL SCHOOL, 1209 Harrison, Goodland
Public. George T. Lyon, dir.
Total enrolment: 186
Accreditation: State Ed. Dept.
Admission: 16 yrs. of age or older
Electrical technology, automotive technology, drafting technology

OLATHE UNIFIED DISTRICT No. 233, Olathe
Public. W. Fick, supt.
Total enrolment: 3,600
Technician enrolment: 40
Accreditation: NCA, State Ed. Dept.
Electronic data processing technology

University of Kansas, Extension Division, Lawrence
Public. H. T. Walker, dir.
Total enrolment: 11,250
Technician enrolment: 816
Accreditation: NCA
Drafting technology*, electrical technology*, electro-mechanical technology*, industrial electronic technology*, industrial technology*, machine drafting and design*, technical writing*, data processing*, electronics technology*

Wichita Public Schools, 640 N. Emporia, Wichita 67214
Public. G. T. Butts, dir., tech. ed.
Total enrolment: 68,210
Technician enrolment: 124
Accreditation: State Ed. Dept., NCA
Drafting technology, electronics technology

KENTUCKY

Ashland Area Vocational School, 41st and Winchester Avenue, Ashland
Public
Electronics technology**, mechanical technology*

Hazard Area Vocational School, 645 N. Main Street, Hazard
Public. W. Prater, dir.
Total enrolment: 300
Technician enrolment: 120
Accreditation: State Ed. Dept.
Automotive technology**, drafting technology**, electronics technology**, heavy equipment technology

Jefferson County Area Vocational School, Valley Station
Public
Electronics technology

Lafayette Vocational Technical School, Springhill Dr., Lexington 40503
Public. Claude W. Howard, dir.
Total enrolment: 948
Technician enrolment: 54
Admission: 18 yrs. of age and satisfactory GATB score
Electronic communications technology, mechanical drafting technology

Madisonville Area Vocational School, 637 W. Center St., Madisonville
Public. S. M. Jones, dir.
Total enrolment: 403
Technician enrolment: 13
Commercial broadcast technology**, electronics technology**

Mayo State Vocational School, Paintsville
Public. G. L. Ramey, dir.
Electronics technology**, mechanical drafting and design technology, data processing technology

Northern Kentucky Vocational School, Covington
Public
Electronics technology, data processing technology

Owensboro Area Vocational School, 1501 Frederica Street, Owensboro
Public. H. C. Warren
Total enrolment: 900
Technician enrolment: 90
Admission: 16 yrs. old, satisfactory GATB score
Industrial electronic technology**, metallurgical technology**, electronic communications technology

Somerset Vocational School, N. College Street, Somerset
Public. H. D. Noe, dir.
Total enrolment: 613
Technician enrolment: 391
Accreditation: State Ed. Dept.
Admission: GATB
Commercial broadcast technology, electronic communications technology**, electronics technology, lithographic technology, automotive technology, drafting technology, mechanical technology

United Electronics Institute, 3947 Park Drive, Louisville
Private. Stuart P. Jay, pres.
Total enrolment: 6,000
Technician enrolment: 6,000
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electrical technology**, electronic communications technology**, electronics technology**, industrial electronic technology**

University of Kentucky Community College, Henderson
Public. Marshall Arnold, dir.
Total enrolment: 350
Technician enrolment: 50
Accreditation: SA
Medical laboratory technology, medical technology, nursing, chemical technology, engineering science technology, forest products technology, metallurgical technology, mining engineering technology

University of Kentucky, Northern Community College, Covington 41011
Public. Thomas L. Hankins, dir.
Total enrolment: 870
Technician enrolment: 74
Accreditation: SA
Admission: High-school graduation and recommendation of principal
Nursing

Western Area Vocational School, P. O. Box 278, College Heights, Bowling Green
Public. P. C. Hampton, dir.
Total enrolment: 678
Technician enrolment: 170
Admission: Desire and ability to learn the subject matter
Electronic communications technology**, nursing**, airconditioning, heating, and refrigeration technology**, automotive technology**, industrial drafting and design technology**, machine tool technology**, mechanical drafting technology**, fire-protection technology

LOUISIANA

Avoyelles Vo-Technical Institute, Cottonport
Public. J. W. Gaspard, dir.
Total enrolment: 1,061
Technician enrolment: 34
Accreditation: State Ed. Dept.
Electronics technology**

Baton Rouge Voc-Tech School, 3400 Winbourne Ave., Baton Rouge
Public. J. Bowling, Jr., dir.
Total enrolment: 2,553
Technician enrolment: 241
Electronics technology, refrigeration-airconditioning technology

Capitol Area Vocational School, P. O. Box 2012, Baton Rouge
Public. E. Harris, dir.
Total enrolment: 238
Technician enrolment: 22
Electronic communications technology**

Central Area Trade School, 415 Lee St., Natchitoches
Public. C. L. Cross, dir.
Total enrolment: 284
Technician enrolment: 21
Accreditation: State Ed. Dept.
Admission: 16 yrs. of age or older with at least 2 yrs. of high school
Electronics communications technology*, automotive technology

Delgado Trades and Technical Institute, 615 City Park Ave., New Orleans
Public. Marvin Thames, pres.
Total enrolment: 2,300
Technician enrolment: 800
Admission: High-school graduation or equivalent
Refrigeration and airconditioning technology†, data processing technology, architectural drafting technology, electrical technology†, electronic communications technology†, nursing, chemical technology†, graphic arts technology,

instrumentation technology†, metallurgical technology†, automotive technology, areonautical and astronautical (engineering) technology†, aviation maintenance technology, aviation technology, drafting technology, industrial technology†, mechanical and production engineering technology†, mechanical drafting technology

Delta Area Vocational School, P. O. Box 1321, Monroe
Public. G. W. Muse, dir.
Total enrolment: 83
Technician enrolment: 14
Admission: Able to profit from the instruction and training
Electronics technology

Gulf Area Vocational School, P. O. Box 541, Abbeville
Public. W. W. Finuf, Jr., dir.
Total enrolment: 1,030
Technician enrolment: 63
Electronic communications technology

Jefferson Parish Trade School, 32 First St., Gretna
Public. R. W. Bentley, Jr., dir.
Total enrolment: 1,673
Technician enrolment: 185
Industrial electronic technology

North Central Area Vocational-Technical School, P. O. Box 548, Farmerville
Public. C. C. Ferguson, dir.
Total enrolment: 234
Technician enrolment: 24
Electronic communications technology

Northeast Louisiana Vocational School, P. O. Box 672, Winnsboro
Public. P. R. Purser, dir.
Total enrolment: 407
Technician enrolment: 33
Electronic communications technology

Northwest Louisiana Vocational-Technical School, P. O. Box 804, Minden
Public. J. E. Oswalt, dir.
Total enrolment: 759
Technician enrolment: 72
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electronics technology**, industrial instruments service and repair technology**

Orleans Area Vocational-Technical School, P. O. Box 8202, New Orleans 22
Public. S. W. Collier, dir.
Total enrolment: 463
Technician enrolment: 76
Electronic communications technology

Ouachita Valley Vocational-Technical School, P. O. Box 546, West Monroe
Public. S. W. Jackson, dir.
Total enrolment: 1,564
Technician enrolment: 304
Accreditation: State Ed. Dept.
Admission: A good background in math and science, and be able to pass the standardized achievement test program
Airconditioning technology**, civil technology, electrical technology, industrial electronic technology**, electronic communications technology**

Shreveport Trade School, 837 Hope St., Shreveport 13
Public. J. W. Moore, dir.
Total enrolment: 1,211
Technician enrolment: 100
Industrial electronic technology, refrigeration and airconditioning technology

South Louisiana Trade School, P. O. Box 1330, Houma 70361
Public. H. P. Willis, dir.
Total enrolment: 1,105
Technician enrolment: 57
Admission: High-school graduation or satisfactory achievement test
Electronic communications technology, architectural drafting technology

Sowela Technical Institute, 501 Broad St., Lake Charles
Public. R. H. Smelser, dir.
Total enrolment: 2,267
Technician enrolment: 435
Accreditation: State Ed. Dept.
Admission: High-school graduation, pass entrance tests
Automotive technology**, civil technology**, civil and construction technology**, electronic data processing technology**, drafting technology**, electrical technology*, electronics technology**, industrial electronic technology**, industrial technology**, highway technology*, computer technology*, electronic communications technology*, microminiaturization technology*, chemical technology*, engineering science technology*, graphic arts technology*, instrumentation technology*, airconditioning, heating, and refrigeration technology*, auto-diesel technology*, combustion power technology**, design technology*, industrial drafting and design technology*, machine tool technology*, mechanical technology**

T. H. Harris Vocational-Technical School, 358 E. Laurent St., Opelousas
Public. G. Madlene, dir.
Total enrolment: 1,039
Technician enrolment: 76
Industrial electronic technology, civil technology, mechanical technology*, electronics technology*

MAINE

Southern Maine Vocational Technical Institute, Fort Road, South Portland
Public. E. Hutchinson, prin.
Total enrolment: 385
Technician enrolment: 86
Accreditation: State Ed. Dept.
Admission: High-school graduation with 2 yrs. algebra, geometry, and physics
Electronics technology, electrical technology

University of Maine, College of Technology, Orono
Public. Thomas H. Curry, dir.
Engineering technology, civil technology, electrical technology, mechanical technology, paper and pulp technology

MARYLAND

Allegany Community College, 430 Frederick St., Cumberland
Public. R. S. Zimmer, pres.
Total enrolment: 400
Accreditation: State Ed. Dept., MSA
Admission: High-school graduation. Maturity and course prerequisites
Chemical technology, quality control technology

Baltimore Junior College, 2901 Liberty Heights Ave., Baltimore 21215
Public. H. Bard, pres.
Total enrolment: 2,444
Technician enrolment: 286
Accreditation: State Ed. Dept., MSA
Admission: High-school graduation or equivalent, satisfactory test scores
Electronics technology, construction technology, mechanical technology, laboratory technology, data processing technology, medical technology, nursing

Baltimore Polytechnic Institute, North Avenue and Calvert St., Baltimore
Public. C. A. Burkett, prin.
Electronics technology, mechanical technology

Carver Vocational Technical High School, Presstman and Bentalou Street, Baltimore 21216
Public. Carrie A. Johnson, act. prin.
Total enrolment: 1,442
Accreditation: MSA
Industrial electronic technology, automotive technology, industrial drafting and design technology

Catonsville Community College, 800 S. Rolling Rd., Catonsville 21228
Public. Paul L. Johnson, dean

Total enrolment: 854
Technician enrolment: 45
Accreditation: State Ed. Dept.
Admission: High-school graduation with acceptable pattern of courses or equivalent
Electronics technology, nursing, chemical technology, biological laboratory technology, library technology

Hagerstown Junior College, Hagerstown
Public. A. C. Kepler, pres.
Total enrolment: 639
Technician enrolment: 74
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Engineering technology

Harford Community College, Bel Air
Public. J. W. Musselman, pres.
Total enrolment: 416
Technician enrolment: 41
Accreditation: State Ed. Dept.
Admission: High-school graduation or pass GEDT
Electronics technology, drafting technology, electrical technology

Mergenthaler Vocational Technical High School, 35th St. and Hillen Rd., Baltimore 21218
Public. G. E. Griefzu, prin.
Mechanical technology, tool design technology, electrical maintenance technology, industrial electronics technology

Montgomery Junior College, Takoma Park 12
Public. D. E. Deyo, dean
Total enrolment: 2,367
Technician enrolment: 751
Accreditation: MSA
Admission: Residents, high-school graduation; non-residents, upper half of high-school graduating class
Electronic data processing technology, electrical technology, electronics technology, radiation technology

North Hagerstown High School, Hagerstown
Public. James R. Lemmer, prin.
Total enrolment: 2,250
Technician enrolment: 25
Accreditation: MSA, State Ed. Dept.
Electrical technology

Prince George's Community College, 5000 Silver Hill Rd., Suitland 20028
Public. A. Martin Eldersveld, pres.
Total enrolment: 1,350
Technician enrolment: 38
Accreditation: State Ed. Dept.
Data processing technology*

South Hagerstown High School, Hagerstown
Public. R. T. Whisner, prin.
Electronics technology, machine tool design technology

Wheaton High School, Dalewood and Randolph, Wheaton
Public. E. P. Moran, prin.
Total enrolment: 2,288
Technician enrolment: 105
Accreditation: MSA
Admission: Varies according to technology
Electronics technology, design technology, drafting technology

MASSACHUSETTS

Arlington Technical Institute, High School Bldg., Massachusetts Ave., Arlington
Public. E. J. Lewis, dir.
Total enrolment: 60
Technician enrolment: 60
Admission: High-school graduation, 1 yr. algebra
Electronic data processing technology

Berkshire Community College, Second St., Pittsfield
Public. T. E. O'Connell, pres.
Total enrolment: 575
Technician enrolment: 80
Accreditation: State Ed. Dept., NEA
Admission: High-school graduation with a promising record
Electrical technology, engineering science technology

Fall River Area Vocational-Technical School, 128 Hartwell St., Fall River
Public. J. P. Harrington, dir.
Total enrolment: 406
Technician enrolment: 56
Accreditation: State Ed. Dept.
Electronics technology, nursing

Framingham Area Vocational-Technical School, Framingham
Public
Electronics technology*

Franklin Institute of Boston, 41 Berkeley St., Boston 02116
Public. L. J. Dunham, Jr., dir.
Total enrolment: 761
Technician enrolment: 600
Admission: High-school graduation, recommendation by high-school principal, 2 yrs. of math and 1 yr. of science
Automotive technology, airconditioning and heating technology*, civil technology†, drafting technology, architectural drafting technology*, electrical technology, electro-mechanical technology, electronics technology**†, industrial electronic technology†, industrial technology*, drafting and tool design*, machine drafting and design technology*, machine tool technology*, mechanical technology†, instrumentation technology*, chemical technology, structural engineering and design technology, surveying technology, electronic communications technology

Leominster Area Vocational-Technical School, Leominster
Public
Electronics technology*, mechanical technology*

Lowell Area Vocational-Technical School, Lowell
Public
Electronics technology*

Lowell Technological Institute, Division of Evening Studies, Lowell 01854
Public. E. B. Van Dusen, dir., evening school
Total enrolment: 4,900
Technician enrolment: 2,300
Accreditation: NEA, State Ed. Dept.
Admission: High-school graduation, 1 yr. algebra, 1 yr. plane geometry
Chemical technology, radiation technology

Lynn Area Vocational-Technical School, Lynn
Public
Mechanical technology*

Marlboro Area Vocational School, Marlboro
Public
Mechanical drafting and design technology

Massachusetts Bay Community College, 27 Garrison St., Boston
Public. J. F. McKenzie, dir.
Total enrolment: 720
Accreditation: State Bd. of Collegiate Authority
Admission: High-school graduation
Electrical technology, electronics technology

Massachusetts Trades Shops School, 155-163 High St., Boston 02110
Private. J. B. Gouse, dir.
Total enrolment: 1,000
Technician enrolment: 1,000
Accreditation: State Ed. Dept.
Admission: Passing of qualification test
Drafting and tool design**, machine drafting and design**, electronics technology**, electro-mechanical drafting technology

New Bedford Area Vocational-Technical School, 181 Hillman St., New Bedford
Public. Z. Walter Janiak, dir.

Total enrolment: 840
Technician enrolment: 26
Accreditation: NEA
Admission: Mech. aptitude test, math test, reading comprehension test
Electronics technology**

Newton Area Vocational-Technical School, Newton
Public
Electronics technology**, mechanical technology, production technology*

Newton Junior College, Washington Park at Walnut Street, Newtonville 02160
Public. C. W. Dudley, pres.
Total enrolment: 605
Technician enrolment: 86
Accreditation: State Ed. Dept., NEA
Admission: High-school graduation, SAT, personal interview
Business data processing technology, electronics technology, nursing

Northeast Institute of Industrial Technology, 41 Phillips St., Beacon Hill, Boston
Private. J. W. Hoffman, pres.
Total enrolment: 850
Technician enrolment: 850
Accreditation: State Ed. Dept., Mass. Bd. Collegiate Authority
Admission: High-school graduation
Airconditioning and heating technology, drafting technology, architectural drafting technology, electronics technology, industrial electronic technology, electrical technology, electro-mechanical drafting technology, electro-mechanical technology, electronic communications technology, electronic drafting technology, instrumentation technology*, design technology, industrial drafting and design technology, mechanical drafting technology

Northern Essex Community College, Chadwick St., Haverhill 01832
Public. H. Bentley, pres.
Total enrolment: 650
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation, SAT, at least 3 yrs. math
Electronics technology, electronic communications technology, industrial electronic technology

Pittsfield Area Vocational-Technical School, Pittsfield
Public
Electronics technology**

Quincy Area Vocational-Technical School, 107 Woodward Ave., Quincy 02169
Public. Maurice J. Daly, dir.
Total enrolment: 300
Technician enrolment: 13
Admission: High-school graduation, upper half of graduating class
Electronics technology*

St. Joseph's Hospital School for Medical Record Technicians, 220 Pawtucket St., Lowell 01854
Private. Sister Marie Roger, R.R.L., dir.
Total enrolment: 6
Technician enrolment: 6
Accreditation: American Medical Assoc., A.A. of Med. Rec. Librarians
Admission: High-school graduation, proficiency in typing
Medical records technology**, nursing**, X-ray technology**

Springfield Area Vocational School, Springfield
Public
Electronics technology, mechanical technology, electronic data processing technology

Weldon Vocational High School, Bradlee Rd., Medford
Public. Walter D. Reid, dir.
Total enrolment: 340
Technician enrolment: 50
Accreditation: NEA
Admission: Aptitude tests
Electrical technology, electronics technology, industrial electronic technology**

Wentworth Institute, 550 Huntington Ave., Boston 15
Private. E. B. Van Dusen, dean of instr.
Total enrolment: 3,283
Accreditation: Mass. Bd. Collegiate Authority
Admission: High-school graduation and prescribed courses
Aircraft maintenance technology†, architectural engineering technology†, building construction technology†, civil and highway engineering technology†, electronic engineering technology†, electrical engineering technology†, mechanical engineering technology (heat power and design options)†, mechanical technology (machine processes and design options)†, metals engineering technology†, production engineering technology†

Weymouth Vocational Technical High School
1051 Commercial St., Weymouth
Public. Ray G. Parker, dir.
Total enrolment: 360
Technician enrolment: 25
Admission: High-school algebra, geometry, and physics
Structural design in architecture

Worcester Industrial Technical Institute, 26 Salisbury St., Worcester 01605
Public. Walter B. Denner, dir.
Total enrolment: 300
Technician enrolment: 200
Admission: High-school graduation, 2 yrs. algebra, 1 yr. geometry, 1 yr. physics, and 1 yr. mechanical drawing
Industrial electronic technology, mechanical technology, data processing technology, civil technology, computer technology, electrical technology, optical technology, metallurgical technology, drafting technology

MICHIGAN

Alma High School, 520 Liberty St., Alma
Public
Chemical and metallurgical technology*

Alpena Community College, 666 Johnson St., Alpena 49707
Public. S. E. Van Lare, dir.
Total enrolment: 575
Technician enrolment: 90
Accreditation: NCA
Admission: High-school graduation
Drafting technology, electrical technology, electronics technology, machine tool technology, metallurgical technology, chemical technology, industrial production technology

Arthur Hill Technical High School, 512 S. Michigan Ave., Saginaw
Public. H. Chapman, prin.
Technician enrolment: 296
Accreditation: State Ed. Dept.
Electrical technology, electronics technology, mechanical drafting and design, mechanical production technology

Bay City Public Schools, 1800 Columbus Ave., Bay City
Public. Edmund Morelli, dir., voc. ed.
Total enrolment: 14,000
Technician enrolment: 500
Accreditation: NCA
Agri-business technology, soils technology, data processing technology, architectural drafting technology, electrical technology, electronic communications technology, graphic arts technology, automotive technology, drafting technology, mechanical drafting technology

Delta College, University Center
Public. Donald J. Carlyon, act. pres.
Total enrolment: 5,000
Technician enrolment: 475
Accreditation: State Ed. Dept.
Admission: High-school graduation, various curriculums have special requirements
Electronics technology, mechanical technology, chemical technology, architectural engineering technology, nursing, X-ray technology, instrumentation technology

DETROIT ENGINEERING INSTITUTE, 2030 Grand River Ave., Detroit 48226
Private. R. E. Nauth, pres.
Total enrolment: 225
Technician enrolment: 225
Accreditation: State Ed. Dept., American Institute for Design and Drafting
Admission: High-school graduation
Drafting technology, design technology, industrial drafting and design technology, machine tool technology, mechanical and production engineering technology, mechanical drafting technology, mechanical technology

EAST DETROIT HIGH SCHOOL, 15501 Couzens, East Detroit
Public. C. Grieg, prin.
Technician enrolment: 86
Electrical technology, electronics technology

FERRIS STATE COLLEGE, 901 S. State St., Big Rapids 49307
Public. Victor F. Spathelf, pres.
Total enrolment: 5,250
Technician enrolment: 1,470
Accreditation: NCA
Admission: High-school graduation or equivalent, native ability and sufficient aptitude
Data processing technology, architectural drafting technology, building construction technology, highway technology, surveying technology, electronic communications technology, electronics technology, industrial electronic technology, dental assistant, optical technology, medical assistant, sanitary engineer technology, X-ray technology, chemical technology, graphic arts technology, airconditioning, heating, and refrigeration technology, auto-diesel technology, automotive technology, technical illustration, industrial technology, machine tool technology, mechanical drafting technology, food-processing technology, electrical power technology

FITZGERALD PUBLIC SCHOOLS, 23200 Ryan Road, Warren
Public. W. Fensch, prin.
Technician enrolment: 12
Electronics technology

FLINT COMMUNITY JUNIOR COLLEGE, 1401 E. Court St., Flint
Public. Charles Donnelly, dean
Total enrolment: 5,500
Technician enrolment: 267
Accreditation: State Ed. Dept., NCA
Admission: High-school graduation plus 1 yr. each of drafting and algebra for technology programs
Electronics technology, nursing, chemical technology, airconditioning technology, industrial production technology, mechanical design technology

GOGEBIC COMMUNITY COLLEGE, Ironwood
Public. J. A. Solin, dir.
Total enrolment: 358
Technician enrolment: 10
Accreditation: NCA
Admission: High-school graduation or equivalent
Electrical technology, medical laboratory technology, medical records technology, nursing, drafting technology

GRAND RAPIDS JUNIOR COLLEGE, 143 Bostwick Ave., NE, Grand Rapids 49502
Public. D. Fink, dean
Total enrolment: 4,000
Technician enrolment: 211
Accreditation: NCA, State Ed. Dept.
Admission: High-school graduation or over 21 yrs. old
Civil technology, electronic data processing technology, drafting technology, architectural drafting technology, electronics technology, mechanical technology, chemical technology, dental technology

HENRY FORD COMMUNITY COLLEGE, 5101 Evergreen Road, Dearborn
Public. A. J. Elges, tech. dean
Total enrolment: 9,200
Technician enrolment: 6,000
Accreditation: NCA
Admission: High-school graduation for residents; C+ average for non-residents
Automotive technology**, airconditioning and heating technology*, electronic data processing technology*, drafting technology**, electrical technology**, electronics technology**, industrial electronic technology**, machine tool technology**, mechanical technology*, metallurgical technology**, computer technology*, electro-mechanical technology**, electronic communications technology**, nursing**, instrumentation technology*, auto-diesel technology*, design technology*, fluid power (engineering) technology**, hydraulics technology**, industrial drafting and design technology**, industrial illustration technology*, mechanical and production engineering technology*, mechanical drafting technology**

HIGHLAND PARK COLLEGE, Highland Park 3
Public. Paul H. Jones, dean
Total enrolment: 2,300
Accreditation: NCA
Admission: High-school graduation and upper half of graduating class for nonresident
Drafting technology, nursing

JACKSON COMMUNITY COLLEGE, 512 Wildwood Ave., Jackson
Public. W. N. Atkinson, pres.
Total enrolment: 1,800
Technician enrolment: 180
Accreditation: NCA
Admission: High-school graduation or equivalent
Electrical technology**, industrial technology**, metallurgical technology*, data processing technology*, electronic communications technology**, nursing, X-ray technology, drafting technology, industrial drafting and design technology*

KELLOGG COMMUNITY COLLEGE, 450 North Ave., Battle Creek
Public. Richard F. Whitmore, dir.
Total enrolment: 2,150
Technician enrolment: 215
Accreditation: State Ed. Dept., NCA
Admission: High-school graduation for day program, desire to learn and related experience for night program
Drafting technology, electronics technology, mechanical technology, data processing technology, architectural drafting technology*, nursing, chemical technology, instrumentation technology, metallurgical technology*, fluid power (engineering) technology*, machine tool technology*

LAKE MICHIGAN COLLEGE, 711 Britain Ave., Benton Harbor 49022
Public. Robert E. Lahti, pres.
Total enrolment: 1,000
Technician enrolment: 125
Accreditation: NCA
Admission: High-school graduation
Data processing technology, electrical technology, electronics technology, metallurgical technology, drafting and design technology, mechanical technology

LAKEVIEW HIGH SCHOOL, 21100 Eleven Mile Road, St. Clair Shores
Public. R. H. Schaublin, prin.
Total enrolment: 1,400
Technician enrolment: 350
Accreditation: NCA
Electronics technology, graphic arts technology, automotive technology, drafting technology, wood technology, metal technology

LANSING COMMUNITY COLLEGE, 210 W. Shiawassee St., Lansing 48914
Public. P. J. Gannon, pres.
Total enrolment: 3,121
Technician enrolment: 827
Accreditation: NCA
Admission: High-school graduation or equivalent
Civil and highway technology, electronics technology, civil technology, electronic data processing, drafting technology, architectural drafting technology, electrical technology, chemical technology, structural engineering and design technology, surveying technology, computer technology, electronic communications

technology, electronic drafting technology, industrial electronic technology, medical technology, nursing, optical technology, sanitary engineer technology, X-ray technology, engineering science technology, metallurgical technology, industrial drafting and design technology, mechanical drafting technology, fire-protection technology, food-processing technology, library technology, police science

Lawrence Institute of Technology,
21000 W. Ten Mile Road,
Southfield 48076
Private. A. D. Hart, dir.
Total enrolment: 3,635
Technician enrolment: 973
Admission: High-school graduation and satisfactory scores on entrance tests
Electrical technology, industrial technology, mechanical technology, building construction technology, electronics technology

Macomb County Community College,
22240 Federal Ave., Warren
Public. Robert E. Turner, pres.
Total enrolment: 5,500
Technician enrolment: 1,221
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Commercial art technology**, surveying technology*, electrical technology**, electronics technology**, nursing, instrumentation technology**, automotive technology*, design technology**, drafting technology**, hydraulics technology**, industrial drafting and design technology**, industrial illustration technology**, machine tool technology**, mechanical drafting technology**, mechanical technology

Michigan Technological University,
Houghton; Branch Campus: Sault Ste. Marie
Public. Raymond L. Smith, pres.
Total enrolment: 4,150
Technician enrolment: 357
Accreditation: NCA
Admission: High-school graduation with units in algebra, plane geometry, physics
Electrical technology*, mechanical technology, civil technology, mechanical and production engineering technology*

Monroe High School,
428 S. Monroe, Monroe
Public. Zane H. Stein, dir. of voc. ed.
Total enrolment: 1,863
Technician enrolment: 150
Accreditation: NCA
Electronics technology, machine tool technology, graphic arts technology, drafting technology, dental assistant

Muskegon Community College,
756 Emerald, Muskegon
Public. Ralph A. Austermiller, pres.
Total enrolment: 2,850
Accreditation: NCA
Admission: High-school graduation or 18 yrs. old
Electrical technology, automotive technology, electronic communications technology, industrial electronic technology, nursing, chemical technology, industrial drafting and design technology, industrial technology, mechanical and production engineering technology, mechanical technology

North Central Michigan College,
Petoskey
Public. A. D. Shankland, dean
Total enrolment: 365
Technician enrolment: 35
Accreditation: State Ed. Dept.
Admission: High-school graduation
Medical laboratory technology, nursing

Northwestern Michigan College,
Traverse City
Public. Preston N. Tanis, pres.
Total enrolment: 997
Technician enrolment: 137
Accreditation: NCA
Admission: High-school graduation with at least C average
Data processing technology, building construction technology, surveying technology, computer technology, nursing

Pontiac Central High School, 250 W. Huron St., Pontiac
Public. F. W. Staley, prin.
Total enrolment: 1,929
Technician enrolment: 262
Accreditation: NCA
Electrical technology, electronics technology, industrial technology, building construction technology, industrial electronic technology, airconditioning, heating, and refrigeration technology, design technology, fluid power (engineering) technology, hydraulics technology, industrial drafting and design technology, machine tool technology

Port Huron Junior College,
323 Erie St., Port Huron
Public. J. C. Browning, dean
Total enrolment: 2,479
Technician enrolment: 85
Accreditation: NCA
Admission: Graduation from an accredited high school
Electronics technology, metallurgical technology, industrial technology

R.E.T.S. Electronics Schools, Intl. Headquarters, 1625 E. Grand Blvd., Detroit 48211 (also schools in Flint and Grand Rapids, Mich., schools in Ohio, Mass., N.J., Pa., Md., Fla., Ind., Ill., and Calif.)
Private. M. Alyea, dir.
Total enrolment (Detroit only): 1,721
Technician enrolment (Detroit only): 1,721
Accreditation: State Ed. Depts. in Mich., Ohio, Mass., N.J., Pa., Md., Ind., Ill., and Calif.
Admission: High-school graduation or equivalent
Practical electronics and communications engineering, industrial electronics, electronics technology, electronic communications technology

St. Clair Shores Adult Education,
25901 Jefferson Avenue, St. Clair Shores
Public. R. Chenoweth, dir.
Total enrolment: 12,985
Technician enrolment: 438
Accreditation: NCA, State Ed. Dept.
Admission: None for adults or out-of-school youth
Automotive technology*, drafting technology*, architectural drafting technology*, electrical technology*, electronics technology*, industrial electronic technology*, welding technology*, data processing technology*, building construction technology*, electronic drafting technology*, aviation technology*, machine tool technology*, welding technology*, boiler operation technology*, airconditioning and refrigeration technology*

Schoolcraft College, 18600 Haggerty Rd., Livonia 48151
Public. Eric J. Bradner, pres.
Total enrolment: 1,740
Technician enrolment: 150
Accreditation: State Ed. Dept.
Data processing technology**, statistical technology, architectural drafting technology**, architectural engineering technology**, building construction technology**, construction technology, civil technology, surveying technology**, electrical technology**, electromechanical technology, electronics technology**, industrial electronic technology, nursing, chemical technology**, metallurgical technology**, automotive technology**, drafting technology, hydraulics technology, industrial drafting and design technology**, machine tool technology**, mechanical technology**

South Macomb Community College,
22900 Federal Ave., Warren
Public. W. E. Bradley
Chemical and metallurgical technology*

Technical School of Metallurgy,
13550 Auburn Ave., Detroit 48223
Private. C. A. Nagler, dir.
Accreditation: State Ed. Dept.
Admission: High-school graduation
Metallurgical technology

WESTERN MICHIGAN UNIVERSITY, Kalamazoo
Public. George Kohrman, dean
Total enrolment: 13,800
Technician enrolment: 160
Accreditation: NCA
Admission: High-school graduation with at least C average
Automotive technology**, electronics technology**, aviation technology**, drafting technology**

MINNESOTA

ALEXANDRIA AREA VOCATIONAL-TECHNICAL SCHOOL, Alexandria
Public. Vernon R. Mack, dir.
Agricultural technology, industrial drafting technology

AUSTIN AREA VOCATIONAL-TECHNICAL SCHOOL, Austin
Public. M. A. Carney, dir.
Total enrolment: 300
Technician enrolment: 75
Accreditation: State Ed. Dept.
Admission: High-school graduation and evidence of ability
Electronic communications technology**, industrial electronic technology**, nursing, automotive technology**

DULUTH AREA VOCATIONAL-TECHNICAL SCHOOL, 1608 London Rd., Duluth
Public. H. D. Hill, dir. voc. and ad. ed.
Total enrolment: 185
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation and testing
Industrial electronic technology**, data processing technology, architectural drafting technology, building construction technology, electrical technology**, electronic communications technology, medical laboratory technology, drafting technology, mechanical drafting technology

EVELETH AREA VOCATIONAL-TECHNICAL SCHOOL, Eveleth
Public. Robert Bergstrom, dir.
Total enrolment: 100
Technician enrolment: 14
Accreditation: State Ed. Dept.
Admission: High-school graduation
Optical technology

GRAND RAPIDS AREA VOCATIONAL-TECHNICAL SCHOOL, Grand Rapids
Public. Leo Keskinen, dir.
Paper and pulp technology

GRANITE FALLS AREA VOCATIONAL-TECHNICAL SCHOOL, Granite Falls
Public. Wendell Howard, dir.
Fluid power technology, machine tool technology

HIBBING AREA TECHNICAL INSTITUTE, 505 E. 16th St., Hibbing
Public. W. E. Magajna, dir.
Total enrolment: 400
Technician enrolment: 179
Accreditation: State Ed. Dept.
Admission: High-school graduation or non-grad over 18 yrs.
Electronic data processing technology**, dental technology, medical laboratory technology, automotive technology**

MANKATO AREA VOCATIONAL-TECHNICAL SCHOOL, Mankato
Public. F. Kalin, dir.
Total enrolment: 2,371
Technician enrolment: 281
Accreditation: State Ed. Dept.
Admission: High-school graduation, passing scores on prerequisite aptitude tests
Electronic data processing technology**, drafting technology, electrical technology*, electronics technology**, industrial electronic technology, machine tool technology*, steam engineering*, highway technician technology, mechanical repair and service technology

MINNEAPOLIS AREA VOCATIONAL-TECHNICAL SCHOOL, 3rd Ave. and 11th St., Minneapolis
Public. R. Nord, dir.
Total enrolment: 11,700
Technician enrolment: 887
Accreditation: State Ed. Dept.
Electronic data processing technology**, electronics technology**, architectural drafting technology**, aviation technology**, machine tool technology**, mechanical drafting technology**

ROCHESTER JUNIOR COLLEGE, Coffman Bldg., Rochester
Public. C. E. Hill, dean
Total enrolment: 1,362
Technician enrolment: 80
Accreditation: NCA
Admission: Graduation from accredited high school or recommendation of the College Counseling Bureau
Electronics technology, engineering technology, laboratory technology, civil technology

ST. CLOUD AREA VOCATIONAL-TECHNICAL SCHOOL, 12th Ave. S., St. Cloud
Public. James C. Wakefield, dir.
Total enrolment: 105
Technician enrolment: 35
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electronics technology*

ST. PAUL AREA VOCATIONAL-TECHNICAL SCHOOL, St. Paul
Public. H. M. Ostrem, dir.
Total enrolment: 19,373
Technician enrolment: 3,587
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology**, airconditioning and heating technology*, electronic data processing technology*, drafting technology**, architectural drafting technology**, electrical technology**, electronics technology**, industrial electronic technology**, machine tool technology**, mechanical technology*, metallurgical technology*, commercial design technology*, architectural engineering technology*, building construction technology**, construction technology*, highway technology**, structural engineering and design technology*, aviation electronics technology*, computer technology*, electro-mechanical drafting technology*, electronic communications technology**, microminiaturization technology*, nursing**, chemical technology*, graphic arts technology**, instrumentation technology*, lithographic technology*, auto-diesel technology*, aviation maintenance technology*, design technology**, fluid power (engineering) technology*, hydraulics technology*, industrial drafting and design technology**, mechanical drafting technology**, electrical laboratory technology*, pneumatics technology*, welding technology*

STAPLES AREA VOCATIONAL-TECHNICAL SCHOOL, Staples
Public. M. Matanich, dir.
Total enrolment: 345
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology, plastics technology, drafting and tool design, diesel technology, agri-business technology

THIEF RIVER FALLS AREA VOCATIONAL-TECHNICAL SCHOOL, Thief River Falls
Public. A. M. Aune, dir.
Total enrolment: 280
Technician enrolment: 30
Accreditation: State Ed. Dept.
Admission: High-school graduation, algebra and physics required
Electronics technology

VIRGINIA JUNIOR COLLEGE, Virginia
Public. G. M. Staupe, dean
Total enrolment: 450
Technician enrolment: 8
Accreditation: NCA
Admission: High-school graduation
Medical technology, nursing

WADENA AREA TECHNICAL INSTITUTE, 405 S.W. Colfax, Wadena
Public. D. C. Hamerlinck, dir.
Total enrolment: 170
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation and entrance exams

Electronics technology, automotive technology, civil technology, highway technology, electrical technology

WILLMAR AREA VOCATIONAL-TECHNICAL SCHOOL, Willmar
Public. C. G. Richardson, dir.
Total enrolment: 700
Technician enrolment: 110
Accreditation: State Ed. Dept.
Admission: High-school graduation, entrance tests
Agri-business technology*, soils technology**, computer technology**, electronics technology**, auto-diesel technology**, automotive technology**, industrial drafting and design technology**

WINONA AREA TECHNICAL SCHOOL, 166 W. Broadway, Winona
Public. T. W. Raine, dir.
Total enrolment: 218
Technician enrolment: 110
Accreditation: State Ed. Dept.
Admission: High-school graduation or 18 yrs. or over
Electronics technology, machine tool technology, agri-business technology*, highway technology, industrial electronic technology, nursing, automotive technology

MISSISSIPPI

BILOXI MUNICIPAL SEPARATE SCHOOL DISTRICT, Biloxi
Public. R. D. Brown, supt.
Total enrolment: 1,390
Technician enrolment: 160
Accreditation: SA
Aviation electronics technology, automotive technology, industrial drafting and design technology

CAPIAH-LINCOLN JUNIOR COLLEGE, Wesson
Public. F. M. Fortenberry, pres.
Total enrolment: 504
Technician enrolment: 27
Building construction technology, mechanical technology

EAST CENTRAL JUNIOR COLLEGE, Decatur
Public. D. Montgomery, pres.
Total enrolment: 555
Technician enrolment: 60
Accreditation: SA
Admission: High-school graduation
Automotive technology, architectural drafting technology, highway drafting technology, agri-business technology, agricultural engineering technology, machine tool technology, electrical technology, medical laboratory technology

GULF COAST JUNIOR COLLEGE DISTRICT, Perkinston
Public. Barry L. Mellinger, coord.
Accreditation: SA
Data processing technology**, electronics technology, nursing, automotive technology, drafting technology, mechanical technology

HINDS JUNIOR COLLEGE, Raymond
Public. G. M. McLendon, pres.
Total enrolment: 1,612
Technician enrolment: 54
Aircraft maintenance technology, drafting and design technology, electronic data processing technology, electronics technology

HOLMES JUNIOR COLLEGE, Goodman
Public
Mechanical drafting and design technology

ITAWAMBA JUNIOR COLLEGE, Fulton
Public. J. S. Crubaugh, pres.
Total enrolment: 650
Technician enrolment: 100
Accreditation: SA
Admission: High-school graduation
Electronics technology, building construction technology*

JONES CO. JUNIOR COLLEGE, Ellisville
Public. M. P. Carter, dir., voc. and tech. training
Total enrolment: 1,250
Technician enrolment: 350
Accreditation: SA
Admission: High-school graduation or equivalent
Data processing technology, electronics technology, nursing, automotive technology, design and drafting technology, machine tool technology, mechanical technology

MERIDIAN HIGH SCHOOL, Meridian
Public. L. O. Todd, supt.
Total enrolment: 852
Technician enrolment: 149
Drafting and design technology, electronic technology, industrial technology

MISSISSIPPI DELTA JUNIOR COLLEGE, Moorhead
Public. W. B. Horton, pres.
Total enrolment: 699
Technician enrolment: 130
Accreditation: SA
Admission: High-school graduation, ACT score 11 or above
Building construction technology, construction technology, electrical technology

NORTHWEST MISSISSIPPI JUNIOR COLLEGE, Senatobia
Public. R. D. McLendon, pres.
Total enrolment: 929
Technician enrolment: 180
Accreditation: SA
Admission: High-school graduation or satisfactory GED and special test scores
Civil technology, electronics technology, data processing technology, electrical technology, automotive technology, design technology, drafting technology, mechanical technology

PASCAGOULA PUBLIC SCHOOLS, P. O. Box 280, Pascagoula
Public. A. L. Meaders, voc. dir.
Total enrolment: 1,165
Technician enrolment: 275-520
Accreditation: State Ed. Dept.
Admission: Aptitude testing, geometry prerequisite
Drafting technology, electrical technology, architectural drafting technology, building construction technology, surveying technology, airconditioning, heating, and refrigeration technology, industrial drafting and design technology, mechanical drafting technology

PEARL RIVER JUNIOR COLLEGE, Poplarville
Public. G. H. Johnson, pres.
Total enrolment: 684
Technician enrolment: 37
Drafting and design, electronics technology, mechanical technology

UTICA JUNIOR COLLEGE, Utica
Public
Mechanical drafting and design technology, civil technology

MISSOURI

BROOKFIELD AREA TECHNICAL AND VOCATIONAL SCHOOL, Brookfield
Public. C. P. Dodge, dir.
Total enrolment: 200
Technician enrolment: 70
Accreditation: State Ed. Dept.
Architectural drafting technology, building construction technology, electronics technology, automotive technology, drafting technology

CENTRAL MISSOURI STATE COLLEGE, Warrensburg
Public. W. C. Lovinger, pres.
Total enrolment: 7,310
Technician enrolment: 64
Accreditation: NCA
Admission: High-school graduation, out-of-state students must be in upper ½ of class
Drafting technology**, automotive technology, electrical technology, industrial technology, data processing technology

CENTRAL TECHNICAL INSTITUTE, 1644 Wyandotte St.,

Kansas City 64108
Private. C. L. Foster, pres.
Total enrolment: 540
Technician enrolment: 460
Accreditation: NHSC
Admission: High-school graduation plus at least 1 yr. algebra
Electronic data processing technology*, industrial electronics technology*, commercial broadcast technology**†, electronic communications technology*, electronics technology†

Crowder College, Box 2, Neosho
Public. Don Shook, pres.
Total enrolment: 400
Technician enrolment: 20
Accreditation: State Ed. Dept., U. of Mo.
Admission: High-school graduation or equivalent
Drafting technology

The David Ranken, Jr. School of Mechanical Trades, 4431 Finney Avenue, St. Louis
Private. G. B. Rodenheiser, dir.
Total enrolment: 610
Technician enrolment: 330
Admission: High-school graduation, min. age 17 yrs. old, qualifying tests
Automotive technology**, airconditioning and heating technology**, drafting technology**, architectural drafting technology**, electrical technology**, electro-mechanical technology**, electronics technology**, industrial electronic technology**, drafting and tool design**, machine drafting and design**, machine tool technology**, mechanical design technology**, mechanical technology**, instrumentation*, printing and photoengraving technology**, communication electronics**, refrigeration technology**

Finlay Engineering College, 7 East 79th Terrace, Kansas City 64114
Public. Gordon M. Finlay, pres.
Total enrolment: 300
Technician enrolment: 300
Accreditation: State Ed. Dept.
Admission: High-school graduation or GED equivalent
Aeronautical technology, electrical technology, mechanical technology, civil technology, refrigeration and airconditioning technology, architectural engineering technology, construction technology, structural engineering and design technology, industrial technology

Franklin Technical School, 1301 Pearl Ave., Joplin
Public. R. W. Baker, dir.
Total enrolment: 900
Technician enrolment: 275
Accreditation: NCA
Admission: High-school graduation plus acceptable test scores
Electronics technology**, mechanical technology**, electronic communications technology*, nursing*, automotive technology

Hickman High School, Columbia
Public. R. C. Shaw, supt.
Total enrolment: 1,500
Technician enrolment: 53
Accreditation: State Ed. Dept., NCA
Electronics technology, electronic communications technology*

Hillyard Vocational and Technical School, 801 S. 9th Street, St. Joseph
Public. W. P. Green, dir.
Total enrolment: 423
Technician enrolment: 91
Accreditation: NCA
Admission: High-school seniors and junior-college students
Drafting technology**, architectural drafting technology**, electrical technology**, electronics technology**, industrial electronic technology

Jefferson City Senior High School, 609 Union St., Jefferson City
Public. Marvin E. Fleming, prin.
Total enrolment: 1,200
Technician enrolment: 20
Accreditation: NCA
Data processing technology**, nursing

Junior College District of Jefferson County, P. O. Box 126, Hillsboro 63050
Public. Charles J. McClain, pres.
Total enrolment: 300
Technician enrolment: 25
Accreditation: NCA, U. of Mo.
Admission: High-school graduation or equivalent for residents; upper ⅔ of class for non-residents
Architectural drafting technology, drafting technology, industrial drafting and design technology, mechanical drafting technology

Kansas City Junior College, Kansas City
Public
Electronic data processing technology

Kansas City Public Schools, Vocational Education, 1211 McGee St., Kansas City
Public. H. W. Dahlor, dir. voc.-tech. ed.
Total enrolment: 310
Accreditation: State Ed. Dept.
Admission: Tests and screening committee
Data processing technology, refrigeration and airconditioning technology, electronics technology, graphic arts technology, drafting technology, mechanical technology

Kirksville Public Schools, Board of Education Bldg., Kirksville
Public. O. W. Phillips, supt.
Total enrolment: 2,600
Technician enrolment: 65
Accreditation: State Ed. Dept.
Electronics technology

Kirksville Senior High School, Kirksville
Public
Total enrolment: 558
Technician enrolment: 110
Accreditation: NCA
Airconditioning and heating technology, civil and construction technology*, electronics technology, industrial electronic technology*

Linn Area Technical School, Linn
Public. T. Willett, supt.
Total enrolment: 130
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology, electronics technology, machine drafting and design

Mehlville Senior High School, 3120 Lemay Ferry Road, St. Louis 63125
Public. E. Merryman, asst. supt.
Total enrolment: 2,000
Technician enrolment: 112
Accreditation: NCA, State Ed. Dept.
Electronics technology**, machine tool technology, graphic arts technology, design technology**

Mexico Senior High School, Mexico
Public. L. Buford Thomas, supt.
Technician enrolment: 34
Electronics technology*, mechanical technology*

O'Fallon Technical High School, 5101 Northrup, St. Louis 63110
Public. Henry C. Briesemeister, prin.
Total enrolment: 6,835
Technician enrolment: 848
Accreditation: NCA
Electronic data processing technology*, drafting technology*, architectural drafting technology, structural engineering and design technology, electrical technology**, electronics technology*, nursing, instrumentation technology*, lithographic technology*, auto-diesel technology*, automotive technology*, hydraulics technology*, machine tool technology*, mechanical drafting technology*, electroplating technology*

Poplar Bluff Senior High School, Poplar Bluff
Public. D. Simmons, supv. of voc. and ad. ed.
Total enrolment: 1,700

Technician enrolment: 35
Accreditation: State Ed. Dept., NCA
Admission: High-school graduation for night programs
Electronics technology**

St. Louis-St. Louis County Junior College District, 7508 Forsyth Blvd., Clayton 5
Public. Joseph P. Cosand, pres.
Total enrolment: 5,000
Technician enrolment: 3,000
Admission: High-school graduation or equivalent
Commercial design technology, architectural engineering technology, electrical technology, electronics technology, industrial electronic technology, dental technology, medical records technology, nursing, mechanical technology

St. Louis County Technical School, 5600 Country Day Lane, Berkeley 63134
Public. L. Clark, dir.
Total enrolment: 440
Technician enrolment: 230
Admission: Aptitude tests are required
Electronic data processing technology**, electronics technology**, computer technology*, drafting technology**, mechanical drafting technology**

Southeast Missouri Trade-Technical Institute, Pine St., Sikeston
Public. Harold Vogel, dir.
Total enrolment: 450
Technician enrolment: 145
Accreditation: State Ed. Dept.
Computer technology, electrical technology**, electronic communications technology**, electronics technology**, industrial electronic technology, microminiaturization technology, nursing*, graphic arts technology, airconditioning, heating, and refrigeration technology**, auto-diesel technology**, automotive technology**, design technology**, drafting technology**

Springfield School of Technology, Board of Education, 815 North Sherman, Springfield
Public. D. W. Berryman, dir.
Technician enrolment: 164
Accreditation: State Ed. Dept.
Admission: High-school graduation, entrance examinations
Data processing technology**, electronics technology**, design and drafting technology**

MONTANA

Great Falls High School, Great Falls
Public. R. W. Swarthout, prin.
Total enrolment: 1,600
Technician enrolment: 82
Accreditation: NWA
Building construction technology, electrical technology, graphic arts technology, combustion power technology, drafting technology, machine tool technology

Helena Senior High School, Dept. of Aeronautics and Related Trades, 2300 East Poplar, Helena
Public. William A. Korizek, dir. voc. ed.
Total enrolment: 180
Technician enrolment: 24
Accreditation: NWA, Fed. Av. Agency
Admission: Electronics course, 2 yrs. of math
Electronics technology

Missoula County High School, South & Bancroft, Missoula
Public. Benjamin A. Ulmer, dir. ad. & tech. ed.
Total enrolment: 3,000
Technician enrolment: 200
Accreditation: NWA, State Ed. Dept.
Admission: 16 yrs. old or more for voc.-tech. courses
Agri-business technology, architectural drafting technology**, building construction technology**, highway technology*, structural engineering and design technology*, electrical technology*, health technology*, medical records technology*, medical technology*, nursing*, forest products technology**, automotive technology**, drafting technology**, industrial drafting and design technology**, machine tool technology**, mechanical drafting technology**, fire-protection technology*

Northern Montana College, Havre
Public. J. R. Crowley, pres.
Total enrolment: 907
Technician enrolment: 247
Accreditation: NWA
Admission: Residents, graduation from accredited high school; non-residents, graduation in upper half of high-school class or suitable score on ACT
Automotive technology, drafting technology, electrical technology, electronics technology, diesel technology, agri-business technology, chemical technology, construction technology, mechanical engineering technology, electronics engineering technology

NEBRASKA

Nebraska Vocational Technical School, Milford
Public. L. A. Welsh, dir.
Total enrolment: 645
Technician enrolment: 615
Accreditation: State Ed. Dept.
Admission: High-school graduation and tests
Automotive technology, airconditioning and heating technology, civil technology, electronics data processing technology, drafting technology, architectural drafting technology, electrical technology, electronics technology, building construction technology, auto-diesel technology, machine tool technology, fire-protection technology, auto body technology

Omaha Public Schools, Voc. and Adult Ed., 3902 Davenport St., Omaha 68131
Public. Edwin H. Parrish, dir.
Total enrolment: 5,300
Technician enrolment: 165
Accreditation: NCA, State Ed. Dept.
Admission: Satisfactory grades in math and science, pre-technical drafting and pre-technical electrical courses
Drafting technology**, instrumentation technology*, data processing technology, computer technology, electrical technology**

South High School, 4519 S. 24th St., Omaha
Public. Richard C. Krebs, prin.
Technician enrolment: 500
Accreditation: NCA
Data processing technology, architectural drafting technology, electronic communications technology, electronics technology, graphic arts technology, drafting technology, machine tool technology, mechanical drafting technology

NEVADA

Carson High School, P. O. Box 603, West King St., Carson City 89701
Public. Morse R. Burley, prin.
Total enrolment: 789
Technician enrolment: 170
Accreditation: NWA
Electronics technology, drafting technology

Clark County School District, Vocational-Technical & Adult Education Dept., P. O. Box 551, Las Vegas
Public. R. L. Sturm, dir.
Total enrolment: 5,500
Technician enrolment: 800
Accreditation: NWA, State Ed. Dept.
Admission: High-school graduation, extension classes by examination plus interview
Airconditioning and heating technol-

ogy**, civil technology*, civil and construction technology*, electronic data processing technology**, drafting technology*, architectural drafting technology*, electronic technology**, industrial electronic technology*, highway technology*, nursing*, graphic arts technology*

MINERAL COUNTY SCHOOL DISTRICT,
651-A St., Hawthorne
Public. F. Smalley, supt.
Total enrolment: 1,800
Accreditation: NWA
Admission: Resident of Mineral County and high-school graduation
Automotive technology, electronics technology**, industrial electronic technology**

UNIVERSITY OF NEVADA, Reno. Extension Centers at Carson City, Ely, Fallon, and Lovelock
Public. H. J. Wolf, dir., (Reno)
Total enrolment: 3,080
Technician enrolment: 460
Admission: High-school graduation, passing entrance exam in area of training
Civil technology*, drafting technology*, architectural drafting technology**, electrical technology*, electronics technology**, architectural drafting technology**, architectural engineering technology*, highway technology*, structural engineering and design technology*, surveying technology*, computer technology*, electro-mechanical technology*, electronic communications technology*, electro-mechanical drafting technology*, electronic drafting technology*, industrial electronic technology*, nursing, radiation technology*, X-ray technology**, nucleonics*, design technology**, industrial drafting and design technology*, mechanical drafting technology**

WASHOE COUNTY SCHOOLS, Reno
Public
Electronic data processing technology, electronics technology

WHITE PINE HIGH SCHOOL,
844 Aultman St., Ely
Public. Joseph Thiele, prin.
Total enrolment: 750
Technician enrolment: 70
Accreditation: NWA
Electronics technology, automotive technology, mechanical technology

NEW HAMPSHIRE

COLBY JUNIOR COLLEGE, New London
Private. Everett M. Woodman, pres.
Total enrolment: 554
Technician enrolment: 69
Accreditation: NEA
Medical records technology, medical technology

DAVIS VOCATIONAL AREA SCHOOL,
Main St., Dover
Public. Bernard R. Smith, dir.
Total enrolment: 500
Technician enrolment: 300
Accreditation: State Ed. Dept.
Admission: GATB
Building construction technology, electronics technology, industrial electronic technology, automotive technology, design technology*, drafting technology**, fluid power (engineering) technology*, hydraulics technology*, industrial drafting and design technology, machine tool technology, mechanical and production engineering technology*, mechanical technology**, food-processing technology, sheet metal technology

NEW HAMPSHIRE TECHNICAL INSTITUTE,
Fan Rd., Concord 03301
Public. George M. Strout, dir.
Total enrolment: 260
Technician enrolment: 260
Admission: Entrance examination
Computer (programing) technology, electrical technology, electronics technology, mechanical technology

STEVENS HIGH SCHOOL, Broad St., Claremont
Public. Frederick Carr, prin.
Total enrolment: 850
Technician enrolment: 66
Accreditation: NEA
Building construction technology, industrial drafting and design technology, machine tool technology

THOMPSON SCHOOL OF AGRICULTURE,
14 Putnam Hall, Durham 03824
Public. Philip S. Barton, dir.
Total enrolment: 160
Technician enrolment: 53
Accreditation: NEA
Admission: High-school graduation or 18 yrs. of age and 2 yrs. of high school
Agri-business technology, soils technology, forest technology

NEW JERSEY

BERGEN COUNTY VOCATIONAL AND TECHNICAL HIGH SCHOOL,
200 Hackensack, Hackensack
Public. H. Stephan, dir.
Total enrolment: 1,697
Technician enrolment: 76
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, qualifying aptitude test
Chemical technology, drafting and design technology, electrical technology, electronics technology

BURLINGTON COUNTY VOCATIONAL AND TECHNICAL SCHOOLS,
Cadillac Rd., Burlington
Public. John K. Ossi, dir.
Total enrolment: 200
Technician enrolment: 75
Accreditation: State Ed. Dept.
Admission: High-school graduation plus aptitude test
Data processing technology*, electronic communications technology**, electronics technology**, drafting technology**

CAMDEN COUNTY VOCATIONAL-TECHNICAL HIGH SCHOOL, 6008 Browning Rd., Pennsauken
Public. Donald C. Springle, supt.
Total enrolment: 1,000
Technician enrolment: 300
Accreditation: State Ed. Dept.
Electronics technology, electrical technology, electronic communications technology, chemical technology, nucleonics, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, machine tool technology

CAPE MAY COUNTY VOCATIONAL-TECHNICAL INSTITUTE, Franklin St., Cape May
Public. Robert Toft, dir.
Total enrolment: 108
Technician enrolment: 43
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Architectural drafting technology, electronics technology, industrial electronic technology*, airconditioning, heating, and refrigeration technology*, design and drafting technology, industrial drafting and design technology*

ELECTRONIC TRAINING CENTER,
7300 Crescent Blvd., Pennsauken
Private. M. Freedland, adm.
Total enrolment: 300
Technician enrolment: 220
Accreditation: State Ed. Dept.
Admission: Personal interview, high-school graduation
Electronics technology, computer technology, electro-mechanical drafting technology, electronic communications technology, electronic drafting technology, industrial electronic technology

Essex County Vocational and Technical High Schools,
209 Franklin St., Bloomfield
Adm. Offices: 90 Washington St., East Orange
Public. J. S. Umowski, prin.
Total enrolment: 1,935
Accreditation: State Ed. Dept.
Aeronautical technology**, drafting technology**, architectural drafting technology**, electrical technology**, electronics technology**, industrial electronic technology**, industrial technology**, drafting and tool design**, machine drafting and design**, machine tool technology**, mechanical design technology**, mechanical technology**, metallurgical technology**

Essex County Vocational and Technical High Schools,
1 University Pl., Irvington
Adm. Offices: 90 Washington St., East Orange
Public. Joseph M. Fair, prin.
Total enrolment: 2,018
Accreditation: State Ed. Dept.
Electrical technology**, electronics technology**, mechanical technology**, mechanical drafting and design technology

Essex County Vocational and Technical High Schools,
275 Sussex Avenue, Newark
Adm. Offices: 90 Washington St., East Orange
Public. Edward J. Nugent, prin.
Total enrolment: 1,366
Accreditation: State Ed. Dept.
Admission: High-school graduation, personal interview
Chemical and metallurgical technology**, electronics technology**, drafting and design**, electrical technology**, aeronautical technology**, industrial technology**, electronic data processing technology*, refrigeration and airconditioning technology**, architectural drafting technology*, mechanical technology**, photographic technology*

Essex County Vocational and Technical High Schools,
300 N. 13th St., Newark
Adm. Offices: 90 Washington St., East Orange
Public. Rosalie C. Risinger, prin.
Total enrolment: 1,420
Accreditation: State Ed. Dept.
Commercial art and design technology, medical technology*, dental technology*, nursing*

Matawan Regional High School,
Atlantic Ave., Matawan
Public. John V. Caracciolo, prin.
Total enrolment: 1,800
Accreditation: MSA
Electronic communications technology, machine tool technology

Middlesex County Vocational and Technical High Schools, 256
Easton Ave., New Brunswick
Public. B. D. Coe, dir.
Total enrolment: 4,100
Technician enrolment: 750
Accreditation: State Ed. Dept.
Admission: Test battery, interview, and high-school graduation
Airconditioning and heating technology*, electronics technology**, construction technology*, surveying technology*, electrical technology*, electronic drafting technology*, industrial electronic technology*, dental technology*, medical laboratory technology*, nursing*, chemical technology*, instrumentation technology*, auto-diesel technology*, automotive technology*, drafting technology**, industrial drafting and design technology*, machine tool technology*, mechanical drafting technology*, stationary engineering technology*

Monmouth County Technical Institute, Sleepy Hollow Rd.,
Middletown
Public. Donald P. Hoagland, supt.
Admission: High-school graduation or equivalent
Automotive technology, mechanical drafting technology

Newark College of Engineering,
Division of Technology, 323 High St., Newark 07102
Public. Clarence H. Stephans, dir., Div. of Tech.
Total enrolment: 6,250
Technician enrolment: 1,200
Admission: High-school graduation with 1 yr. of algebra
Architectural engineering technology, building construction technology, civil technology, surveying technology*, computer technology*, electrical technology, electronics technology*, chemical technology, instrumentation technology*, metallurgical technology*, airconditioning, heating, and refrigeration technology*, drafting technology*, machine tool technology, mechanical drafting technology, fire-protection technology*, plastics technology

Ocean County Vocational and Technical Schools, Water St.,
Toms River
Public. K. Miller, dir.
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Drafting and design technology, electronics technology

Radio-Electronics-Television School,
255 Passaic Ave., Kearny
Private. L. Howard, pres.
Total enrolment: 516
Technician enrolment: 125
Accreditation: State Ed. Dept.
Admission: Personal interview
Electronics technology

RCA Technical Institute,
Rt. 38, Cherry Hill
Private. L. W. Snow, dean
Total enrolment: 280
Technician enrolment: 160
Accreditation: State Ed. Dept.
Admission: Personal interview, high-school graduation or equivalent
Computer technology, electronics technology

Salem County Technical Institute,
Golfview, Penns Grove
Public. H. C. Donaghay, dir.
Total enrolment: 200
Technician enrolment: 140
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Automotive technology**, electronics technology**, mechanical technology**, instrumentation technology**, chemical technology*, scientific glassblowing technology**, industrial drafting and design technology**

Somerset County Vocational-Technical Schools, Somerville
Public. Robert Glassett, act. dir.
Total enrolment: 1,500
Technician enrolment: 260
Accreditation: State Ed. Dept.
Admission: High-school graduation and test
Building construction technology**, electronic communications technology*, electronics technology**, mechanical drafting technology**

Sussex County Vocational and Technical Schools,
County Serv. Bldg., Newton
Public. J. Cummings, dir.
Total enrolment: 256
Technician enrolment: 45
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, personal interview
Automotive technology, drafting and design technology, electronics technology, metals technology

Trenton Junior College, Trenton 08608
Public. John Perry Pritchett, pres.
Total enrolment: 1,614

Technician enrolment: 497
Accreditation: MSA
Admission: Good high-school record and SAT score
Civil technology, electronic data processing technology, architectural drafting technology, electrical technology, chemical technology, mechanical technology, architectural engineering technology, structural engineering and design technology, surveying technology, computer technology, electronics technology, dental technology, medical laboratory technology, machine tool technology, mechanical drafting technology

Trenton Technical Institute,
636 E. State St., Trenton
Private. J. Freund, dir.
Total enrolment: 243
Technician enrolment: 95
Accreditation: State Ed. Dept.
Admission: Personal interview
Electronics technology

Union County Technical Institute,
1160 Globe Ave., Mountainside
Public. G. H. Baxel, supt.
Total enrolment: 200
Technician enrolment: 110
Accreditation: State Ed. Dept.
Admission: High-school graduation and admission tests
Electronic data processing technology**, highway technology*, electronics technology**, chemical technology**, mechanical technology**

Union Technical Institute,
2000 Morris Ave., Union
Private. P. Barotta, dir.
Total enrolment: 191
Technician enrolment: 98
Accreditation: State Ed. Dept.
Admission: Personal interview and entrance examination
Electronics technology

Warren County Vocational School and Technical Institute,
151 W. Washington Ave., Washington 07882
Public. C. Green, dir.
Total enrolment: 985
Technician enrolment: 395
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, personal interview, aptitude test
Building construction technology*, highway technology*, electrical technology*, electronics technology**, industrial electronic technology**, graphic arts technology*, lithographic technology*, automotive technology**, design technology**, drafting technology**, machine tool technology**, mechanical technology**

NEW MEXICO

Albuquerque High School,
110 Broadway, NE, Albuquerque
Public. W. F. Wright, prin.
Total enrolment: 1,848
Technician enrolment: 140
Accreditation: NCA
Electronics technology, drafting and tool design, machine tool technology

Carlsbad High School, Carlsbad
Public. William W. Loos, prin.
Total enrolment: 1,200
Accreditation: NCA
Electronics technology*

Eastern New Mexico University,
Portales
Public. A. Bettina, dir.
Total enrolment: 2,800
Technician enrolment: 40
Accreditation: NCA
Admission: Graduation from accredited high school
Civil technology, electronics technology, drafting and design technology, technical illustration

New Mexico Highlands University,
Las Vegas 87701
Public. Thomas C. Donnelly, pres.
Total enrolment: 1,300
Technician enrolment: 75
Accreditation: NCA
Admission: High-school graduation with minimum of C average
Electrical technology, electro-mechanical drafting technology, electro-mechanical technology, electronics technology, industrial electronic technology

New Mexico State University,
University Park
Public. Roger B. Corbett, pres.
Total enrolment: 5,000
Technician enrolment: 95
Accreditation: NCA
Admission: High-school graduation
Civil technology, electronics technology, mechanical technology

Santa Fe High School, 200 Lincoln Ave.,
Santa Fe
Public. T. B. Walsh, prin.
Total enrolment: 1,685
Technician enrolment: 180
Accreditation: NCA
Automotive technology, drafting technology, machine tool technology

University of New Mexico,
Albuquerque
Public. Tom L. Popejoy, pres.
Total enrolment: 10,723
Technician enrolment: 43
Accreditation: NCA
Admission: High-school graduation with various subjects required
Data processing technology, dental technology

NEW YORK

Academy of Aeronautics, La Guardia Airport, Flushing 11371
Private. Walter M. Hartung, pres.
Total enrolment: 1,200
Technician enrolment: 1,200
Admission: High-school graduation with credits in math and science
Electronics technology†, aerospace design technology†, aerospace mechanical technology†

Auburn Community College, Franklin Street, Auburn
Public. A. T. Skinner, pres.
Total enrolment: 1,360
Accreditation: State Ed. Dept.
Admission: High-school graduation
Industrial technology

Bethpage High School, Cherry Ave.,
Bethpage 11714
Public. Walter M. Yannett, act. prin.
Total enrolment: 1,563
Technician enrolment: 17
Accreditation: MSA, State Ed. Dept.
Architectural drafting technology, medical laboratory technology

Bronx Community College,
120 E. 184 St., Bronx 10468
Public. Morris Meister, pres.
Total enrolment: 6,105
Technician enrolment: 1,401
Accreditation: MSA
Data processing technology, electrical technology†, medical laboratory technology, nursing, X-ray technology, chemical technology, industrial technology, mechanical technology†, nuclear technology

Broome Technical Community College, Upper Front St.,
Binghamton 13902
Public. C. C. Tyrrell, pres.
Total enrolment: 2,945
Technician enrolment: 362
Accreditation: MSA, Council on Dental Education
Admission: High-school graduation, math through trigonometry and one physical science
Civil technology*†, electrical technology*†, industrial technology**, mechanical technology*†, chemical technology*†

Buffalo Board of Co-op Educational Services, First Supervisory District,

Erie County, 99 Aero Dr., Buffalo
14225
Public. Ernest H. Hoeldtke, supt.
Total enrolment: 1,200
Technician enrolment: 135
Accreditation: State Ed. Dept.
Industrial electronic technology, nursing, airconditioning, heating, and refrigeration technology, machine tool technology, mechanical drafting technology, mechanical technology

CALHOUN HIGH SCHOOL, District #3,
State St., Merrick
Public. G. Wayne Dameron, dir. voc. ed.
Total enrolment: 2,316
Technician enrolment: 56
Accreditation: State Ed. Dept.
Instrumentation technology

CENTRAL TECHNICAL HIGH SCHOOL,
717 S. Warren St., Syracuse
Public. William E. Haws, dir. of tech.-voc. ed.
Total enrolment: 2,300
Technician enrolment: 1,400
Accreditation: MSA, State Ed. Dept.
Admission: Ability to profit by instruction
Data processing technology*, building construction technology*, highway technology*, computer technology*, electrical technology*, electronics technology*, nursing*, chemical technology*, graphic arts technology*, instrumentation technology*, metallurgical technology*, automotive technology*, design technology*, drafting technology*, machine tool technology*, mechanical drafting technology*, welding technology*, photography technology*

CORNING COMMUNITY COLLEGE, Corning
Public. W. L. Perry, pres.
Total enrolment: 1,400
Technician enrolment: 200
Accreditation: State Ed. Dept., MSA
Admission: High-school graduation
Mechanical technology, nursing, chemical technology, engineering science technology

DUTCHESS COMMUNITY COLLEGE, Pendell
Road, Poughkeepsie
Public. J. F. Hall, pres.
Total enrolment: 1,580
Accreditation: State Ed. Dept., MSA
Admission: High-school graduation or equivalent
Architectural drafting technology, mechanical design technology, commercial design technology, data processing technology, electrical technology, electromechanical technology*, electro-mechanical drafting technology*, dental assistant**, nursing, chemical technology, engineering science

EDISON TECHNICAL-INDUSTRIAL HIGH SCHOOL, 725 Clifford Ave., Rochester
14621
Public. Ingraham Humphrey, prin.
Total enrolment: 1,440
Technician enrolment: 352
Accreditation: MSA, State Ed. Dept.
Admission: School entrance examination
Structural engineering and design technology, electrical technology, electronics technology, instrumentation technology, design technology, machine tool technology

ERIE COUNTY TECHNICAL INSTITUTE, Main
and Youngs Road, Buffalo 14221
Public. James E. Shenton, act. pres.
Total enrolment: 1,849
Technician enrolment: 1,200
Accreditation: U. of the State of N. Y.
Admission: High-school graduation with principal's recommendation, satisfactory scores on State University entrance examination
Data processing technology, construction technology**†, electrical technology**†, dental hygiene technology, medical laboratory technology**, optical technology**, chemical technology**†, metallurgical technology**, industrial technology**, mechanical technology**†, police science

GEORGE WESTINGHOUSE VOCATIONAL & TECHNICAL HIGH SCHOOL,
105 Johnson, Brooklyn
Public
Data processing technology*, computer technology*, commercial broadcast technology*, electronics technology*

HORNELL SENIOR HIGH SCHOOL,
Maple City Park, Hornell 14843
Public. Robert J. Johnson, prin.
Total enrolment: 850
Technician enrolment: 28
Accreditation: MSA
Electrical technology

HUDSON VALLEY COMMUNITY COLLEGE,
Troy
Public. O. V. Guenther, pres.
Total enrolment: 2,495
Accreditation: State Ed. Dept.
Admission: High-school graduation, algebra, exam
Airconditioning technology, automotive technology, chemical technology, electrical technology, electronics technology, mechanical technology

JAMESTOWN HIGH SCHOOL,
350 E. Second St., Jamestown
Public. John M. Woodruff, coord.
Total enrolment: 2,000
Technician enrolment: 75
Accreditation: State Ed. Dept.
Electrical technology, mechanical technology

LAWRENCE HIGH SCHOOL, Reilly Rd.,
Cedarhurst
Public. Eckardt Beck, dir.
Total enrolment: 2,074
Technician enrolment: 36
Accreditation: State Ed. Dept.
Electrical technology, electronics technology

LEVITTOWN, NEW YORK, PUBLIC SCHOOLS (UNION FREE SCHOOL DISTRICT NO. 5), North Village Green, Levittown
Public. B. F. Rappaport, asst. to supt.
Total enrolment: 18,000
Technician enrolment: 350
Accreditation: State Ed. Dept.
Admission: Varies with programs
Electronics technology, printing and photoengraving technology, mechanical design and metallurgy, data processing technology, instrumentation technology, automotive technology, food-processing technology

MOHAWK VALLEY COMMUNITY COLLEGE,
1101 Sherman Dr., Utica 13501
Public. A. V. Payne, pres.
Total enrolment: 2,853
Technician enrolment: 617
Accreditation: MSA
Admission: High-school graduation or equivalent, satisfactory scores on testing program
Civil technology**, electrical technology**†, mechanical technology**†, nursing, engineering science technology**

NASSAU COUNTY TRADE AND TECHNICAL CENTER, 36 New York Ave., Westbury
Public. Arthur H. Side, prin.
Total enrolment: 1,200
Technician enrolment: 250-300
Computer technology, drafting technology, automotive technology, airconditioning technology, electrical technology, industrial electronic technology, dental technology, medical technology, lithographic technology, design technology, mechanical drafting technology

NEWFIELD HIGH SCHOOL, Middle County
Central School District No. 11,
Selden, Long Island
Public. George R. Harrison, dir. of voc.-tech. ed.
Accreditation: State Ed. Dept.
Admission: Aptitude tests
Electrical technology**, electronics technology**, nursing, automotive technology**

NEW YORK CITY COMMUNITY COLLEGE OF APPLIED ARTS AND SCIENCES,
City University of New York,
300 Pearl Street, Brooklyn 11201

Public. M. H. Block, pres.
Total enrolment: 9,344
Technician enrolment: 8,737
Accreditation: MSA
Admission: High-school graduation or equivalent, general ability and aptitude tests, physical capacity appraisal to determine suitability for particular course
Chemical technology, data processing technology, construction technology, electrical technology, medical laboratory technology**, nursing, optical technology*, radiation technology*, drafting technology*, hydraulics technology*, mechanical technology, dental laboratory technology, graphic arts and advertising technology**

NIAGARA COUNTY COMMUNITY COLLEGE, 430 Buffalo Ave., Niagara Falls 14303
Public. Ernest Notar, pres.
Total enrolment: 800
Technician enrolment: 50
Accreditation: State Ed. Dept.
Admission: High-school graduation and specific subjects related to the technologies
Electronics technology**, nursing, mechanical drafting technology*, industrial laboratory technology**

NORTH TONAWANDA SENIOR HIGH SCHOOL, 405 Meadow Dr., North Tonawanda 14120
Public. Joseph Dorczak, dir., trade & tech. ed.
Total enrolment: 1,850
Technician enrolment: 35
Accreditation: MSA
Admission: 85% scholastic average
Electronics technology

OLEAN HIGH SCHOOL, 4th & Sullivan, Olean
Public. W. J. O'Connell, dir. of voc. ed.
Total enrolment: 1,020
Technician enrolment: 320
Accreditation: State Ed. Dept.
Construction technology, electronics technology, industrial electronic technology, industrial drafting and design technology

ONONDAGA COMMUNITY COLLEGE, 700 E. Water St., Syracuse 13210
Public. Francis E. Almstead, pres.
Total enrolment: 970
Technician enrolment: 125
Accreditation: State Ed. Dept.
Admission: High-school graduation and examinations
Electronics technology**, chemical technology**, mechanical technology**

ORANGE COUNTY COMMUNITY COLLEGE, Middletown 10940
Public. Robert T. Novak, pres.
Total enrolment: 1,200
Technician enrolment: 120
Accreditation: MSA
Admission: High-school graduation
Electrical technology*, electronics technology*, medical technology, nursing, chemical technology, design technology

PLAINVIEW-OLD BETHPAGE HIGH SCHOOL, Central Park Rd., Plainview
Public. John H. Mulski, supv.
Total enrolment: 2,000
Technician enrolment: 80
Accreditation: State Ed. Dept.
Electronics technology

POTTER ROAD SHOP CENTER, Industrial High School, 705 Potter Rd., Buffalo 14224
Public. Donald C. Sieber, act. prin.
Total enrolment: 512
Technician enrolment: 50
Accreditation: State Ed. Dept.
Electrical technology, airconditioning, heating, and refrigeration technology, automotive technology, design technology, machine tool technology

POUGHKEEPSIE HIGH SCHOOL, Forbus & May Sts., Poughkeepsie
Public. Carlton D. Durfey, dir. of tech. ed.
Total enrolment: 2,600
Technician enrolment: 600
Accreditation: State Ed. Dept.
Electrical technology, automotive technology, mechanical technology

PRATT INSTITUTE, Brooklyn 11205
Private. Richard H. Heindel, pres.
Total enrolment: 4,700
Accreditation: MSA, National Architectural Accrediting Board, American Library Association
Admission: High-school graduation, SAT, CEEB
Commercial design technology, publications technology, architectural drafting technology, building construction technology, construction technology, ceramic technology, graphic arts technology, lithographic technology

RCA INSTITUTES, 350 W. 4th St., New York 10014
Private. George F. Maedel, pres.
Total enrolment: 3,500
Technician enrolment: 2,000
Admission: High-school graduation, 3 yrs. math, 1 yr. physics
Computer technology*, commercial broadcast technology*, electrical technology†, electronic communications technology†, electronics technology†, industrial electronic technology*

ROCKLAND COMMUNITY COLLEGE, 145 College Rd., Suffern 10901
Public. Seymour Eskow, pres.
Total enrolment: 2,000
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Nursing, chemical technology, graphic arts technology

ROME FREE ACADEMY, Rome
Public. Carl S. Paige, dir.
Total enrolment: 2,100
Electrical technology, electronics technology

SAMUEL GOMPER VOCATIONAL TECHNICAL HIGH SCHOOL, 455 Southern Blvd., Bronx 55
Public. William T. Haatwalker, prin.
Total enrolment: 2,000
Technician enrolment: 500
Accreditation: MSA
Admission: Technical courses by examination only
Electrical technology, electronics technology

SAUNDERS TRADE AND TECHNICAL HIGH SCHOOL, Yonkers
Public. George L. Kleitz, dir. of voc. ed.
Architectural drafting and building construction, electrical technology, industrial chemistry, mechanical design and construction

SEWANHAKA HIGH SCHOOL, 500 Tulip Ave., Floral Park, Long Island
Public. R. C. Wipper, dist. dir.
Total enrolment: 12,000
Technician enrolment: 972
Accreditation: MSA
Admission: Excellence in math and science, passing grades in mandated subjects
Automotive technology, architectural drafting technology, electrical technology, architectural engineering technology, building construction technology, construction technology, instrumentation technology, drafting technology, industrial drafting and design technology, industrial technology, machine tool technology, mechanical drafting technology, mechanical technology

STATE UNIVERSITY OF NEW YORK, AGRICULTURAL AND TECHNICAL COLLEGE AT ALFRED, Alfred
Public. David H. Huntington, pres.
Total enrolment: 1,736
Technician enrolment: 1,736
Accreditation: MSA
Admission: High-school graduation, upper ½ of graduating class, and curriculum requirements
Airconditioning and heating technology**†, electronic data processing technology**, drafting technology*,

electrical technology**†, mechanical technology†, agri-business technology, architectural engineering technology, soils technology, building construction technology, electronic communications technology**†, medical laboratory technology, nursing, engineering science technology**, instrumentation technology, auto-diesel technology*, automotive technology*, machine tool technology*, mechanical and production engineering technology*, mechanical drafting technology*

State University of New York, Agricultural and Technical College at Canton, Canton
Public. Albert E. French, pres.
Total enrolment: 830
Accreditation: MSA, State Ed. Dept.
Admission: High-school graduation
Agri-business technology, agricultural engineering technology, dairy technology, construction technology, electrical technology**†, engineering science technology, airconditioning, heating, and refrigeration technology**†, automotive technology†, mechanical design technology†

State University of New York, Agricultural and Technical College at Cobleskill, Cobleskill
Public. Edward F. Pierce, dean of instruc.
Total enrolment: 1,050
Accreditation: MSA
Admission: High-school graduation
Agri-business technology, agricultural engineering technology, soils technology, computer technology, medical laboratory technology, chemical technology, instrumentation technology

State University of New York, Agricultural and Technical College at Delhi, Delhi
Public. W. R. Kunsela, pres.
Total enrolment: 1,000
Technician enrolment: 1,000
Accreditation: MSA
Admission: High-school graduation, recommendation from high-school principal or guidance counselor, pass admissions examinations
Agri-business technology, agricultural engineering technology, soils technology, architectural drafting technology, building construction technology, construction technology, civil technology, highway technology, structural engineering and design technology, surveying technology, airconditioning, heating, and refrigeration technology, food administration technology

State University of New York, Agricultural and Technical College at Farmingdale, Farmingdale
Public. C. W. Laffin, Jr., pres.
Total enrolment: 6,545
Technician enrolment: 2,195
Accreditation: MSA
Admission: High-school graduation, units of math and science dependent upon curriculum area chosen
Airconditioning technology, mechanical technology, photographic technology, agri-business technology, agricultural engineering technology, soils technology*, data processing technology*, architectural drafting technology, architectural engineering technology, building construction technology, construction technology, civil technology, highway technology, computer technology*, electrical technology**, electronics technology, dental technology, nursing, engineering science technology, metallurgical technology*, automotive technology, aviation technology, industrial illustration technology*, machine tool technology*, mechanical and production engineering technology, food-processing technology, police science

State University of New York, Agricultural and Technical College at Morrisville, Morrisville
Public. R. N. Whipple, pres.
Total enrolment: 1,100
Technician enrolment: 1,100
Accreditation: MSA
Admission: High-school graduation, CEEB, certain required subjects depending upon curriculum applied for
Agri-business technology, agricultural engineering technology, soils technology, data processing technology, architectural drafting technology, electrical technology, medical laboratory technology, nursing, engineering science technology, instrumentation technology, automotive technology, drafting technology, mechanical technology, food-processing technology, dairy technology, agronomy

Suffolk County Community College, 533 College Road, Selden, Long Island 11784
Public. A. M. Ammerman, pres.
Total enrolment: 1,600
Technician enrolment: 120
Accreditation: State U. of N. Y.
Admission: High-school graduation
Electronics technology, mechanical technology, nursing

Sullivan County Community College, South Fallsburg
Public. Richard K. Greenfield, pres.
Total enrolment: 550
Technician enrolment: 50
Accreditation: State Ed. Dept.
Admission: High-school graduation plus GATB
Hotel technology**

Thomas A. Edison Vocational and Technical High School, 60 S. 3rd Avenue, Mt. Vernon
Public. D. A. Panitz, prin.
Electronics technology, industrial chemistry, mechanical design and construction

Trott Vocational High School, 11th St. and Ashland Ave., Niagara Falls
Public. C. M. Armstrong, prin.
Industrial chemistry, structural drafting and design

Ulster County Community College, 214 W. Chestnut St., Kingston
Public. Dale B. Lake, pres.
Total enrolment: 1,100
Technician enrolment: 60
Accreditation: U. of the State of N.Y.
Admission: High-school graduation
Medical laboratory technology, mechanical technology

Voorhees Technical Institute, 450 W. 41st St., New York
Private. E. H. Miner, pres.
Total enrolment: 225
Technician enrolment: 225
Accreditation: State Ed. Dept.
Admission: High-school graduation, two years high-school math, one year science
Automotive technology, airconditioning and heating technology, industrial electronic technology, building construction technology, lithographic technology, machine tool technology

W. Tresper Clarke High School, East Meadow School District, Edgewood Dr., Westbury
Public. Matthew M. Graham, dir. of voc. ed.
Total enrolment:539
Technician enrolment: 209
Accreditation: State Ed. Dept.
Data processing technology*, architectural engineering technology, building construction technology, structural engineering and design technology, electronics technology

Westchester Community College, 75 Grasslands Road, Valhalla
Public. P. C. Martin, pres.
Total enrolment: 3,659
Technician enrolment: 1,800
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, math and science background
Electronics technology**, mechanical technology**, construction technology**, civil technology**, computer technology*, electronic communications technology**, medical laboratory technology**, chemical technology**

William E. Grady Vocational-Technical High School, 25 Brighton 4th Rd., Brooklyn 11235
Public. Irving Waldt, prin.

Total enrolment: 1,600
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: Aptitude examination
Electronics technology

NORTH CAROLINA

Agricultural and Technical College of North Carolina, Greensboro
Public. L. C. Dowdy, pres.
Total enrolment: 3,200
Technician enrolment: 175
Accreditation: SA
Admission: High-school graduation with credits, including 4 in English, 2 in math, 1 each in social studies and science; SAT score of 700 or above
Building construction technology, electrical technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, mechanical technology

Asheville-Buncombe Technical Institute, 340 Victoria Road, Asheville
Public. T. W. Simpson, pres.
Total enrolment: 5,200
Technician enrolment: 250
Accreditation: State Ed. Dept.
Admission: 16 yrs. old, high-school graduation, acceptable aptitude, personal interview
Automotive technology, airconditioning and heating technology, electronic data processing technology, drafting technology, electronics technology, mechanical technology, chemical technology, civil technology, nursing, mechanical drafting technology

Cape Fear Technical Institute, 9 South 13th St., Wilmington
Public. M. J. McLeod, pres.
Total enrolment: 5,021
Technician enrolment: 91
Accreditation: State Ed. Dept.
Admission: High-school graduation, subject preparation varies for training field
Airconditioning and heating technology**, architectural drafting technology**, electro-mechanical technology*, metallurgical technology*, chemical analysis*, water chemistry*, agri-business technology*, building construction technology*, construction technology*, civil technology*, electrical technology*, electro-mechanical drafting technology*, nursing**, chemical technology*, instrumentation technology**, drafting technology**, mechanical drafting technology**, marine technology**

Catawba Valley Technical Institute, Hickory
Public. Robert E. Paap, pres.
Total enrolment: 3,800
Technician enrolment: 325
Accreditation: State Dept. of Community Colleges
Admission: High-school graduation, with preference given to those having advanced mathematics and science, SAT
Airconditioning and heating technology, drafting technology, architectural drafting technology, electronic technology**, agri-business technology, auto-diesel technology*, mechanical drafting technology

Central Piedmont Community College, 1141 Elizabeth Ave., Charlotte 28204
Public. Richard H. Hagemeyer, pres.
Total enrolment: 2,682
Technician enrolment: 1,022
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Data processing technology**, construction technology**, surveying technology*, electrical technology**, electronics technology**, medical records technology*, medical technology*, nursing*, chemical technology**, airconditioning, heating, and refrigeration technology*, industrial drafting and design technology**, mechanical and production engineering technology**, fire-protection technology*

Chowan College, Murfreesboro 27855
Private. Bruce E. Whitaker, pres.
Total enrolment: 1,155
Accreditation: SA, State Ed. Dept.
Admission: High-school graduation, SAT of CEEB
Civil technology

Davidson Industrial Education Center, Davidson
Public
Electrical technology, mechanical drafting and design technology

Durham Technical Institute, P. O. Box 1341, 1637 Lawson St., Durham
Public. H. K. Collins, pres.
Total enrolment: 492
Technician enrolment: 93
Accreditation: State Ed. Dept., American Dental Association Council on Dental Education
Admission: High-school graduation or equivalent
Automotive technology**, civil technology**, architectural drafting technology**, electronics technology**, chemical technology**, building construction technology**, highway technology**, electrical technology**, electro-mechanical technology*, industrial electronic technology*, dental technology**, nursing**, instrumentation technology*, metallurgical technology*, auto-diesel technology**, combustion power technology*, internal combustion (engineering) technology*, industrial drafting and design technology*, industrial technology*, machine tool technology*, mechanical and production engineering technology**, mechanical drafting technology**, fire-protection technology*

Fayetteville Technical Institute, P. O. Box 5236, Fayetteville
Public. Howard E. Boudreau, pres.
Total enrolment: 800
Technician enrolment: 225
Accreditation: State Ed. Dept.
Admission: High-school graduation, courses in science and math, GATB test
Airconditioning and heating technology, civil technology, agri-business technology, electronic communications technology, sanitary engineer technology, mechanical drafting technology

Forsyth Technical Institute, 2100 Link Rd., Winston-Salem 27103
Public. E. B. Parry, pres.
Total enrolment: 5,200
Technician enrolment: 475
Accreditation: State Dept. of Community Colleges
Admission: High-school graduation, aptitude determined by GATB score and other aptitude tests, 1 unit in algebra and 1 unit in plane geometry required
Electronics technology**, agri-business technology**, mechanical and production engineering technology**, mechanical drafting and design technology**, horticulture technology**

Gardner-Webb College, Boiling Springs
Public. Robert B. Isner, dean
Total enrolment: 943
Technician enrolment: 53
Accreditation: SA
Admission: High-school graduation and CEEB
Soils technology, data processing technology, dental technology, medical technology, nursing

Gaston Technical Institute, 1025 W. Franklin Ave., Gastonia
Public. W. R. Halstead, dir.
Total enrolment: 421
Technician enrolment: 421
Admission: 2 units of high-school algebra, 1 unit of high-school plane geometry, 1 unit physical science
Mechanical and production engineering technology†, civil engineering technology†, electrical engineering technology†, electronics engineering technology†

Guilford Industrial Education Center, P. O. Box 309, Jamestown
Public. B. B. Roberts, dir.
Electronics technology

Leaksville-Rockingham County Industrial Education Center, Stadium Drive, Spray
Public. G. W. Armfield, asst. dir.
Total enrolment: 976
Admission: High-school graduation or equivalent, satisfactory GATB score
Drafting technology, electronics technology, machine drafting and design, mechanical technology, textile technology

Lee Industrial Education Center, Lee
Public
Electronics technology, mechanical drafting and design technology

Lenoir County Community College, P. O. Box 1296, Kinston
Public. Ben E. Fountain, Jr., pres.
Total enrolment: 150
Technician enrolment: 30
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Drafting technology, electronics technology**, agri-business technology**, nursing**, design technology

Pitt Technical Institute, P. O. Box 97, Greenville
Public. William E. Fulford, Jr., pres.
Total enrolment: 6,011
Technician enrolment: 103
Accreditation: State Ed. Dept.
Agri-business technology, architectural drafting technology, electronics technology, nursing, automotive technology, machine tool technology, fire-protection technology

Randolph Industrial Education Center, 629 Industrial Park, Asheboro
Public. M. H. Branson, pres.
Total enrolment: 2,300
Technician enrolment: 41
Accreditation: State Ed. Dept.
Admission: High-school graduation, algebra 1, modern math
Agri-business technology**, architectural drafting technology*, electrical technology**, electronics technology**, industrial electronic technology*

Southeastern Community College, Whiteville
Public. Warren Land, pres.
Total enrolment: 250
Technician enrolment: 60
Admission: Requirements vary
Agri-business technology**, statistical technology*, electrical technology*, electronic communications technology*, electronics technology*, health technology*, medical laboratory technology*, medical records technology*, medical technology*, nursing**, X-ray technology*, forest products technology*, airconditioning, heating, and refrigeration technology*, auto-diesel technology*, automotive technology**, internal combustion (engineering) technology*, industrial drafting and design technology*, fire-protection technology*

Technical Institute of Alamance, 411 Camp Road, Burlington
Public. W. E. Taylor, pres.
Total enrolment: 2,585
Technician enrolment: 439
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent; other requirements vary with course desired
Airconditioning and heating technology, electronic data processing technology, electronics technology, commercial design technology, chemical technology, mechanical and production engineering technology, mechanical drafting technology

Wayne Technical Institute, P. O. Box 1259, Goldsboro
Public. H. B. Monroe, pres.
Total enrolment: 3,300
Technician enrolment: 290
Accreditation: State Dept. of Community Colleges
Admission: High-school graduation or CEEB
Drafting technology, electrical technology*, electronics technology**, industrial electronic technology*, agri-business technology, soils technology, forestry technology, data processing technology*, computer technology*, forest products technology, airconditioning, heating, and refrigeration technology*, auto-diesel technology*, automotive technology*, aviation maintenance technology*, design technology

Wilson County Technical Institute, 902 Herring Ave., Wilson 27895
Public. S. Del-Mastro, pres.
Total enrolment: 4,500
Technician enrolment: 246
Admission: High-school graduation or equivalent
Airconditioning and heating technology**, electronics technology**, machine tool technology*, agricultural implement technology**, architectural drafting technology*, auto-diesel technology**, mechanical and production engineering technology, mechanical drafting technology**

NORTH DAKOTA

North Dakota State School of Science, Wahpeton
Public. G. W. Haverty, pres.
Total enrolment: 2,028
Technician enrolment: 563
Admission: Technical division—high-school graduation or 17 yrs. or over
Electronic data processing technology, architectural drafting technology, electrical technology, electronics technology, refrigeration and airconditioning technology, civil surveying technology, electro-mechanical drafting technology, electronic communications technology, electronic drafting technology, industrial electronic technology, dental hygienist technology, graphic arts technology, drafting technology, industrial drafting and design technology

OHIO

Ashtabula Technical School, W. 44th St., Ashtabula
Public. William J. Ryan, dir.
Technician enrolment: 25
Admission: High-school graduation, aptitude tests
Electronic engineering technology, mechanical engineering technology

Barberton School of Technology, 489 W. Hopocan, Barberton
Public. W. E. Bauer, dir.
Technician enrolment: 62
Accreditation: State Ed. Dept.
Admission: High-school graduation, entrance tests
Mechanical technology, chemical technology

Canton Area Technical School, 618 High St., Canton 2
Public. G. R. Weiler, supv.
Admission: High-school graduation, recommended by principal, satisfactory scores on engineering and physical science aptitude tests
Mechanical technology, electrical technology

Chandler Technical School, 37047 Ridge Road, Willoughby
Public. Leonard M. Slominski, dir.
Total enrolment: 330
Technician enrolment: 330
Accreditation: State Ed. Dept.
Admission: High-school graduation, strong math and science high-school background, satisfactory test scores
Electronic data processing technology**, drafting technology*, electrical technology**, electronics technology**, mechanical technology**, computer technology**, electro-mechanical drafting technology*, industrial technology**

Cleveland State University, Technical Institute, E. 24th & Euclid Ave., Cleveland 44115
Private. Nicholas R. Rimboi, dir., tech. inst.

Technician enrolment: 1,000
Accreditation: NCA
Admission: High-school graduation or equivalent
Electrical technology, electronic communications technology, industrial electronic technology, airconditioning, heating, and refrigeration technology, design technology, drafting technology, industrial drafting and design technology, industrial technology, mechanical drafting technology

Cleveland Technician School, 4600 Detroit Ave., Cleveland 2
Public. H. B. Armstrong, coord.
Total enrolment: 150
Technician enrolment: 150
Admission: High-school graduation, good background in math and science
Electro-mechanical technology*, electronic communications technology*, electronic drafting technology*, electronics technology, industrial electronic technology, chemical technology, instrumentation technology*, metallurgical technology*, drafting technology*, fluid power (engineering) technology*, hydraulics technology*, industrial drafting and design technology*, industrial technology, mechanical and production engineering technology*, mechanical drafting technology*, mechanical technology

Columbus Area Technician School, 557 Mt. Vernon Ave., Columbus
Public. C. E. Tatsch, dir.
Total enrolment: 175
Technician enrolment: 175
Accreditation: State Ed. Dept.
Admission: High-school graduation, necessary aptitude
Electronics technology, food-processing technology, data processing technology, architectural drafting technology, chemical technology, metallurgical technology, mechanical and production engineering technology

Cuyahoga Community College, 626 Huron Rd., Cleveland 44115
Public. Fred C. Sutton, dean of tech. ed.
Total enrolment: 7,100
Technician enrolment: 2,000
Admission: High-school graduation or 21 yrs. of age
Data processing technology**, architectural drafting technology*, building construction technology**, construction technology*, surveying technology*, electrical technology**, electronic communications technology**, electronic drafting technology*, electronics technology**, industrial electronic technology*, nursing, chemical technology**, instrumentation technology*, metallurgical technology*, airconditioning, heating, and refrigeration technology*, drafting technology*, hydraulics technology*, mechanical and production engineering technology**, mechanical technology*, fire-protection technology**

Dayton Board of Education, Technology Division, 118 East 1st St., Dayton 48402
Public. P. C. Snyder, dir.
Total enrolment: 40
Technician enrolment: 40
Accreditation: State Ed. Dept.
Admission: High-school graduation, aptitude and upper ⅓ in class standing
Graphic arts technology, metallurgical technology, industrial technology

Erieside Institute, 4141 Erie St., Willoughby 44094
Private. Karman Duchon, dir.
Total enrolment: 200
Technician enrolment: 150
Admission: High-school graduation or equivalent
Electrical technology**, electronics technology, industrial electronic technology, airconditioning, heating, and refrigeration technology, design technology, drafting technology, industrial drafting and design technology, industrial technology, mechanical and production engineering technology

Franklin University, 40 W. Long St., Columbus
Private. Joseph F. Frasch, pres.
Total enrolment: 1,600
Technician enrolment: 400
Admission: High-school graduation
Construction technology**, electronics technology**, mechanical drafting technology**

Hamilton Technical School, 332 Dayton Street, Hamilton
Public. A. C. Woedl, dir.
Total enrolment: 55
Technician enrolment: 55
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, strong in math and science background
Electrical technology, mechanical technology

Lorain County Community College, 128 O'Neil Sheffield Center, Lorain
Public. M. J. Lerner, pres.
Total enrolment: 1,063
Technician enrolment: 202
Admission: High-school graduation with good math background
Civil technology, electrical technology**, industrial technology, mechanical technology, data processing technology**, electronics technology**, nursing, chemical technology**, hydraulics technology*

Mansfield High School, 145 W. Park Blvd., Mansfield
Public. V. H. Oberlander, supv.
Technician enrolment: 36
Admission: High-school diploma, proper background in math
Electrical technology**, electronics technology**, industrial technology**, mechanical technology**

Mansfield School of Technology, 218 Marion Ave., Mansfield 44903
Public. G. N. Yoder, dir.
Total enrolment: 149
Technician enrolment: 149
Accreditation: State Ed. Dept.
Admission: High-school graduation, 2 yrs. math (algebra and geometry), prescribed results on GATB, 2 yrs. science, recommendation of principal
Electrical technology**, mechanical technology**, metallurgical technology**

Martins Ferry High School, 800 Hanover St., Martins Ferry
Public. J. Yoder, prin.
Total enrolment: 1,000
Technician enrolment: 160
Accreditation: NCA
Admission: Entrance exams, at least 16 yrs. old
Electronics technology, drafting and tool design, machine tool technology

Ohio College of Applied Science, 1104 Walnut St., Cincinnati 45210
Private. W. W. Culp, pres.
Total enrolment: 1,650
Technician enrolment: 423
Admission: High-school graduation or equivalent, 1 yr. algebra, 1 yr. plane geometry, 1 yr. either physics, chemistry or advanced mathematics
Mechanical engineering technology†, civil engineering technology, electrical engineering technology†, electronics technology†, building construction technology, chemical technology†, architectural technology

Ohio Technical Institute, 886 Sunbury Rd., Columbus
Private. Samuel L. Oppenheimer, pres.
Total enrolment: 200
Technician enrolment: 200
Admission: High-school graduation, at least 1 yr. of math
Architectural drafting technology*, construction technology, civil technology, highway technology*, structural engineering and design technology*, surveying technology*, computer technol-

ogy*, electronic communications technology*, electronics technology**†, industrial electronic technology*

PIKETON VOCATIONAL SCHOOL, Piketon
Public. G. O'Dell, supv.
Total enrolment: 166
Technician enrolment: 37
Accreditation: State Ed. Dept.
Electronics technology

PORTSMOUTH HIGH SCHOOL, Gallia and Waller Sts., Portsmouth 45662
Public. O. M. Gwinn, dir.
Total enrolment: 1,026
Technician enrolment: 19
Accreditation: State Ed. Dept.
Admission: Pass specified tests
Electronics technology

SALEM SCHOOL OF TECHNOLOGY, 1200 East Sixth St., Salem
Public. H. W. Cameron, dir.
Total enrolment: 100
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: High-school graduation and satisfactory GATB score, 1 yr. of algebra
Electrical technology, mechanical technology, civil technology

SINCLAIR COLLEGE, 177 W. Monument Ave., Dayton
Private. C. C. Bussey, pres.
Total enrolment: 1,850
Technician enrolment: 700
Admission: High-school graduation with 1½ units algebra and 1 unit plane geometry
Electronics technology, mechanical technology†, data processing technology

SPRINGFIELD AND CLARK COUNTY SCHOOL OF TECHNOLOGY, 701 E. Home Rd., Springfield
Public. R. O. Brinkman, dir.
Total enrolment: 200
Technician enrolment: 200
Accreditation: State Ed. Dept.
Admission: High-school graduation, aptitude tests, 2 yrs. math in engineering curricula
Electronic data processing technology, electrical technology, mechanical technology, agri-business technology, agricultural engineering technology

TIMKEN VOCATIONAL HIGH SCHOOL, Canton
Public
Electrical technology, mechanical technology

UNIVERSITY OF AKRON, 302 E. Buchtel Ave., Akron 44304
Public. William M. Petry, dean
Total enrolment: 9,986
Technician enrolment: 47
Accreditation: NCA
Admission: High-school graduation, ACT
Electronics technology, chemical technology, design technology, industrial technology

UNIVERSITY COMMUNITY AND TECHNICAL COLLEGE, The University of Toledo, 2801 W. Bancroft St., Toledo 43606
Public. Newton C. Rochte, dean
Total enrolment: 1,600
Technician enrolment: 900
Accreditation: NCA
Admission: High-school graduation
Data processing technology, building construction technology, electronics technology, medical technology, X-ray technology, chemical technology, instrumentation technology, industrial drafting and design technology, mechanical and production engineering technology

UNIVERSITY OF DAYTON, The Technical Institute, 300 College Park Ave., Dayton 45409
Private. James L. McGraw, dir.
Total enrolment: 7,000
Technician enrolment: 325
Accreditation: NCA
Admission: High-school graduation with 3 yrs. of English, 1 yr. algebra, 1 yr. math, SAT
Electronics technology†, chemical technology, industrial technology, mechanical technology†

WILLOUGHBY BOARD OF EDUCATION, Willoughby
Public
Electronics technology, mechanical technology, electronic data processing technology

OKLAHOMA

CAMERON STATE AGRICULTURAL COLLEGE, Lawton
Public. R. B. Burch, pres.
Total enrolment: 1,458
Accreditation: NCA
Admission: High-school graduation
Electrical technology**, electronics technology**, mechanical technology**

CENTRAL PILGRIM COLLEGE, Bartlesville
Private. Norman N. Bonner, pres.
Total enrolment: 201
Accreditation: State Ed. Dept.
Admission: High-school graduation
Nursing

CONNORS STATE AGRICULTURE COLLEGE, Warner
Public. Dr. Self, pres.
Total enrolment: 500
Technician enrolment: 35
Accreditation: NCA
Admission: High-school graduation, ACT
Electronics technology, design technology, drafting technology

EASTERN AGRICULTURAL AND MECHANICAL COLLEGE, Wilburton
Public
Electronics technology, mechanical technology, mechanical drafting and design technology

LANGSTON UNIVERSITY, Langston
Public
Electronics technology

MURRAY STATE AGRICULTURAL COLLEGE, Tishomingo
Public. Freeman McKee, pres.
Total enrolment: 550
Technician enrolment: 30
Accreditation: NCA
Admission: High-school graduation (in-state); upper half of class (out-of-state)
Drafting technology, mechanical and production engineering technology

NORTHEASTERN OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE, Miami
Public
Electronics technology, mechanical drafting and design technology, mechanical technology, chemical technology, electronic data processing technology

NORTHERN OKLAHOMA JUNIOR COLLEGE, Tonkawa
Public. V. R. Easterling, pres.
Total enrolment: 632
Accreditation: NCA
Admission: High-school graduation
Electronics technology, electrical technology

OKLAHOMA CITY PUBLIC SCHOOLS, 900 N. Klein, Oklahoma City
Public. J. F. Parker, supt.
Technician enrolment: 479
Accreditation: NCA, State Ed. Dept.
Civil and construction technology, drafting technology, electronics technology

OKLAHOMA COLLEGE FOR WOMEN, Chickasha
Public
Chemical technology

OKLAHOMA STATE UNIVERSITY, TECHNICAL INSTITUTE, Oklahoma City Branch, 1900 N.W. Tenth St., Oklahoma City
Public. P. P. Chandler, dir.
Total enrolment: 600
Technician enrolment: 600
Accreditation: NCA
Admission: Graduation from accredited high-school, "C" average or above, ranked scholastically among upper ⅔

of high-school graduating class, upper ½ for out-of-state students, ACT
Civil technology, electronic data processing technology, architectural drafting technology, electronics technology, instrumentation technology, architectural engineering technology, industrial drafting and design technology, computer programing technology

OKLAHOMA STATE UNIVERSITY, TECHNICAL INSTITUTE, Stillwater 74075
Public. Donald W. Brown, dir.
Total enrolment: 14,560
Technician enrolment: 437
Accreditation: NCA
Admission: Graduation from accredited high school, "C" average or above, ranked scholastically among upper ⅔ of high-school graduating class
Construction technology†, electrical technology†, electronics technology†, mechanical technology†, fire-protection technology†, metallurgical technology, aviation maintenance technology, drafting and design technology†, radiation and nuclear technology

POTEAU COMMUNITY COLLEGE, Poteau
Public. G. E. Evans, pres.
Total enrolment: 100
Technician enrolment: 15
Accreditation: Okla. Regents for Higher Ed.
Admission: High-school graduation
Electronics technology, chemical technology

SAYRE JUNIOR COLLEGE, Sayre
Public. Harry Patterson, pres.
Total enrolment: 247
Technician enrolment: 87
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology**, industrial electronic technology**

OREGON

BLUE MOUNTAIN COMMUNITY COLLEGE, 700 S.E. Third, Pendleton
Public. Robert Hawk, dean, tech. ed.
Total enrolment: 500
Technician enrolment: 250
Accreditation: State Ed. Dept.
Admission: Graduation from accredited high school or equivalent
Civil technology, drafting technology, electronics technology, agri-business technology, dental technology, nursing, auto-diesel technology

CENTRAL OREGON COLLEGE, Bend
Public. D. P. Pence, pres.
Total enrolment: 500
Technician enrolment: 175
Accreditation: State Ed. Dept.
Automotive technology, civil technology, drafting technology, electrical technology*, electronics technology, industrial electronic technology, machine tool technology*

CLATSOP COMMUNITY COLLEGE, Astoria
Public. R. D. Boss, pres.
Total enrolment: 336
Technician enrolment: 133
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Automotive technology, civil technology, electronics technology, architectural drafting technology*, surveying technology, electrical technology, electronic drafting technology, auto-diesel technology, drafting technology, industrial drafting and design technology, machine tool technology, mechanical drafting technology, mechanical technology, fire-protection technology*, forestry technology

LANE COMMUNITY COLLEGE, 200 North Monroe, Eugene
Public. Dale Parnell, pres.
Total enrolment: 1,020
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, or 18 yrs. or older
Civil and construction technology, drafting technology, electronics technology, nursing, aviation technology

MULTNOMAH COLLEGE, 1022 S. W. Salmon St., Portland 97205
Private. John S. Griffith, pres.
Total enrolment: 2,450
Technician enrolment: 278
Accreditation: NWA
Admission: High-school graduation or equivalent, 1 yr. of algebra, pre-entrance testing
Electronics engineering technology, electronics technology, automotive technology, gas and diesel, mechanical technology, welding technology

OREGON POLYTECHNIC INSTITUTE, College of Engineering Technology, Oregon Polytechnic Building, 4th Ave. at Madison St., Portland 97204
Private. A. R. Gale, dir.
Total enrolment: 160
Technician enrolment: 100
Admission: High-school graduation or equivalent
Airconditioning and heating technology*, civil technology, mechanical technology, architectural engineering technology, surveying technology*, industrial drafting and design technology*

OREGON TECHNICAL INSTITUTE, Oretech Branch P. O., Klamath Falls 97601
Public. W. D. Purvine, pres.
Total enrolment: 1,000
Technician enrolment: 1,000
Accreditation: NWA
Admission: High-school graduation or special student status by review of the admissions standards committee
Automotive technology, drafting technology†, electronics technology†, mechanical technology†, highway technology†, surveying technology†, welding technology, machine shop technology, structural design technology†, dental assistant technology, medical technology, X-ray technology

PORTLAND COMMUNITY COLLEGE, 049 S. W. Porter, Portland
Public. Amo DeBernardis, pres.
Total enrolment: 7,072
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, 1 yr. algebra and physics
Data processing technology**, architectural drafting technology**, civil technology**, highway technology**, structural engineering and design technology**, surveying technology, electronics technology**, industrial electronic technology**, drafting technology**

PORTLAND ELECTRONICS COLLEGE, 1017 S.W. Washington St., 202 New Fliedner Bldg., Portland 5
Private. W. E. Richardson, dir.
Total enrolment: 225
Technician enrolment: 225
Admission: Pre-entrance testing for non-high-school graduate
Electronics technology, commercial broadcast technology, electronic communications technology, electronic drafting technology

SALEM TECHNICAL COMMUNITY COLLEGE, 4389 Satter Dr. N.E., Salem
Public. P. F. Wilmeth, dir.
Total enrolment: 1,000
Technician enrolment: 350-400
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Civil technology**, electronic data processing technology**, drafting technology**, electronics technology**, mechanical technology**, architectural drafting technology**, highway technology**, surveying technology**, electronic communications technology, forest products technology, fire-protection technology**

SOUTHWESTERN OREGON COLLEGE, Box 509, North Bend
Public. W. L. Van Loan, pres.

2

Total enrolment: 1,008
Technician enrolment: 400
Accreditation: State Ed. Dept.
Admission: High-school graduation or entrance exams
Drafting technology, electrical technology, mechanical technology, civil technology, structural engineering and design technology, surveying technology, electronics technology, nursing, wood industries technology, automotive technology

Treasure Valley Community College, 1115 W. Idaho Ave., Ontario
Public. Carl G. Devin, dir. voc.-tech. div.
Accreditation: State Ed. Dept.
Agricultural engineering technology*, soils technology, electrical technology*, electro-mechanical technology*, nursing, automotive technology, drafting technology, hydraulics technology*, mechanical technology*

Umpqua Community College, P. O. Box 699, Roseburg
Public. Robert Moldenhauer, dean of voc.-tech.
Total enrolment: 522
Technician enrolment: 43
Accreditation: State Ed. Dept.
Automotive technology

PENNSYLVANIA

A.T.E.S. Technical School, 2823 W. 26th St., Erie
Private. James A. Atkinson, dir.
Total enrolment: 200
Technician enrolment: 200
Admission: Full time—entrance exams, 1 yr. of algebra; part-time—theory testing
Computer technology*, electro-mechanical drafting technology*, electronic communications technology*, electronic drafting technology*, electronics technology*, industrial electronic technology*, electronic engineering technology, machine design technology*, drafting technology*

Aliquippa Standard Evening High School, Harding Ave., Aliquippa
Public. William J. Reinish, prin.
Total enrolment: 650
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: Math and science
Electrical technology*, electronics technology*, industrial electronic technology*, metallurgical technology*

Allentown Community College and Technical Institute, 40 N. Seventeenth St., Lehigh Valley
Public. G. W. Elison, dir.
Total enrolment: 370
Technician enrolment: 85
Accreditation: MSA, Natl. Council Technical Schools
Admission: High-school graduation, principal's recommendation, aptitude and achievement tests
Data processing technology, electronics technology, dental technology, nursing, chemical technology, design technology

Bok Technical High School, 8th and Mifflin Streets, Philadelphia
Public. E. M. Fee, prin.
Total enrolment: 6,300
Technician enrolment: 400
Admission: High-school graduation plus tests
Electrical technology, electronics technology, data processing technology*, structural engineering and design technology*, aviation electronics technology*, computer technology*, industrial electronic technology*, optical technology**, airconditioning, heating, and refrigeration technology*, automotive technology, aviation technology*, drafting technology, machine tool technology**

Bucks County Technical School, Wistar Road, Fairless Hills
Public. G. M. Schaffer, prin.
Total enrolment: 800
Accreditation: State Ed. Dept.
Admission: Successful completion of math, algebra requirement, above-average intelligence
Electronic data processing, drafting technology, electrical technology, electronics technology, instrumentation, chemical technology

Butler Area Schools, 165 New Castle Road, Butler
Public
Chemical and metallurgical technology*, electrical technology*, electronics technology*, instrumentation*, mechanical technology*

Clairton Evening School, Fifth Street, Clairton
Public. J. C. Schreck, dir.
Total enrolment: 700
Technician enrolment: 40
Electronics technology*, instrumentation*

Dobbins Technical High School, 22nd and Lehigh Avenue, Philadelphia 32
Public. F. White, prin.
Total enrolment: 2,200
Technician enrolment: 1,200
Accreditation: State Ed. Dept.
Admission: Entrance examinations, 4 yrs. math and 1 yr. physics
Electronic data processing technology, instrumentation, commercial design technology, architectural drafting technology, building construction technology, computer technology, electrical technology, electronics technology, dental technology, medical laboratory technology, nursing, radiation technology, X-ray technology, chemical technology, graphic arts technology, airconditioning, heating, and refrigeration technology, automotive technology, drafting technology, mechanical drafting technology, mechanical technology, radiological health technology

Eastern Westmoreland Area Vocational-Technical School, 205 Harrison Ave., Latrobe 15650
Public. Carl T. Rorabaugh, dir.
Total enrolment: 350
Technician enrolment: 120
Admission: Above average grades and pass an entrance test
Electronics technology, metallurgical technology, drafting and design technology

Easton Area Joint School System, 811 Northampton St., Easton
Public. Robert A. Nagle, dir., voc. ed.
Total enrolment: 2,000
Technician enrolment: 320
Accreditation: MSA
Admission: GATB
Electrical technology**, electronics technology**, building construction technology**, graphic arts technology**, automotive technology**, machine tool technology**, mechanical drafting technology**

Electronics Training Center, 29 N. Seventh St., Allentown
Private. Robert W. Riedy, dir.
Total enrolment: 275
Technician enrolment: 160
Accreditation: State Ed. Dept.
Admission: High-school graduation
Computer technology, electronic communications technology, electronic drafting technology, electronics technology, industrial electronic technology

Electronics Training Center, 1432 N. Broad St., Philadelphia
Private. John T. Roney, dir.
Total enrolment: 350
Technician enrolment: 120
Accreditation: State Ed. Dept.
Admission: High-school graduation
Computer technology, electronic communications technology, electronics technology, industrial electronic technology

Forbes Trail Area Technical School, Monroeville
Public. F. J. Brown, dir., tech. ed.
Total enrolment: 450
Admission: Average school grades, above average mental ability, and recommendation from high school
Civil and construction technology, electronic data processing technology, electronics technology, mechanical technology, chemical technology

Franklin School of Science and Arts, 251 S. 22nd St., Philadelphia 19103
Private. Israel Zamost, pres.
Total enrolment: 425
Technician enrolment: 300
Accreditation: State Ed. Dept., Bur. of Medical Technology Schools
Medical laboratory technology, medical technology, X-ray technology

Geneva College, Beaver Falls 15010
Private. Edwin C. Clarke, pres.
Total enrolment: 1,198
Technician enrolment: 25
Accreditation: MSA, American Chemical Society
Admission: SAT of CEEB, high-school graduation with 16 units
Medical technology, nursing, engineering science technology

Greensburg Institute of Technology, 302 W. Otterman St., Greensburg
Private. Donna M. Chalfant, pres.
Total enrolment: 150
Technician enrolment: 150
Admission: High-school graduation, math, and science
Architectural drafting technology, building construction technology, structural engineering and design technology, electrical technology, electronics technology, design technology, drafting technology, mechanical drafting technology

Harcum Junior College, Bryn Mawr
Private. Michael A. Duzy, pres.
Total enrolment: 475
Technician enrolment: 24
Accreditation: State Ed. Dept.
Admission: High-school graduation, CEEB
Health technology, medical laboratory technology, medical technology

Harrisburg Area Community College, 2988 N. Second St., Harrisburg
Public
Total enrolment: 450
Technician enrolment: 75
Civil technology, electronics technology, industrial electronic technology, drafting technology

Hazleton High School, Vocational-Technical Dept., 9th & Wyoming Sts., Hazleton
Public. John A. Tima, dir.
Total enrolment: 230
Technician enrolment: 80
Accreditation: State Ed. Dept.
Electronics technology**

Keystone Junior College, La Plume
Private. Harry K. Miller, Jr., pres.
Total enrolment: 530
Technician enrolment: 26
Accreditation: MSA
Admission: High-school graduation and CEEB aptitude tests
Medical records technology, medical technology, nursing

Liberty High School, 240 E. Elizabeth Ave., Bethlehem
Public. Joseph J. Risbon, dir.
Total enrolment: 302
Technician enrolment: 110
Civil technology, electrical technology, metallurgical technology, mechanical and production engineering technology

Lower Bucks County Area Vocational-Technical School, Perkasie
Public
Electronic data processing technology, electronics technology

Mastbaum Technical High School, Frankford Ave. and Clementine St., Philadelphia
Public. William W. Renshaw, prin.
Total enrolment: 1,600
Electrical technology, automotive technology, drafting technology

McCarrie School of Mechanical Dentistry, Inc., 127 S. 13th St., Philadelphia 19107
Private. Edward T. Cunningham, pres.
Total enrolment: 150
Dental technology

McKeesport Vocational High School, O'Neil Boulevard, McKeesport 15132
Public. Bert Johnson, dir. voc.-tech & ad. ed.
Total enrolment: 600
Technician enrolment: 125
Accreditation: MSA
Electronic communications technology, metallurgical technology, design and drafting technology

Meyers High School, Wilkes-Barre City School District, 341 Carey Ave., Wilkes-Barre
Public. Asa N. Casterlin, dir.
Total enrolment: 6,000
Technician enrolment: 60
Accreditation: MSA
Electronic communications technology, electronics technology, industrial electronic technology

Northumberland County Area Vocational Technical School, Box 492, Trevorton 17871
Public. Walter H. Miller, dir. of voc. ed
Total enrolment: 520
Technician enrolment: 118
Accreditation: State Ed. Dept.
Admission: C average or better
Electronics technology, mechanical drafting technology

Penn Technical Institute, 5440 Penn Ave., Pittsburgh 15206
Private. L. A. Dimasi, dir.
Total enrolment: 500
Technician enrolment: 500
Admission: High-school graduation and 1 yr. algebra
Electronics technology

Pennsylvania State University, Allentown Campus, 725 Ridge Ave., Allentown 18102
Public. W. R. Grubbs, dir.
Total enrolment: 648
Technician enrolment: 136
Accreditation: MSA
Admission: High-school graduation, 2 yrs. math, satisfactory SAT scores
Electronics technology*†, electrical technology*†, mechanical technology*, architectural drafting technology*, structural engineering and design technology*, design and drafting technology*†, machine tool technology*, mechanical and production engineering technology*, mechanical drafting technology*

Pennsylvania State University, Altoona Campus, Ivyside Park, Altoona 16601
Public. R. E. Eiche, dir.
Total enrolment: 1,084
Technician enrolment: 276
Accreditation: MSA
Admission: High-school graduation, 2 yrs. math, satisfactory SAT scores
Electronics technology†, agri-business technology, electrical technology†, design technology†, drafting technology†, mechanical drafting technology†

Pennsylvania State University, Behrend Campus, Station Road, Erie
Public. I. H. Kochel, dir.
Total enrolment: 405
Technician enrolment: 142
Accreditation: MSA

Admission: High-school graduation, college boards, 2 yrs. math
Drafting and design†, electronics and electrical technology†

Pennsylvania State University,
Berks Campus, 814 Hill Ave.,
Wyomissing
Public. Harold W. Perkins, dir.
Total enrolment: 225
Accreditation: MSA
Admission: Upper ⅗ of graduating class, 2 yrs. algebra or algebra and plane geometry, SAT
Electrical technology, electronics technology, design technology, drafting technology

Pennsylvania State University,
DuBois Campus, College Place,
DuBois 15801
Public. D. S. Hiller, dir.
Total enrolment: 308
Technician enrolment: 106
Accreditation: MSA
Admission: Graduation from an accredited secondary school, scholastic aptitude test scores from CEEB, 2 units of algebra and/or plane geometry, 3 units of English
Electrical and electronics technology†, design and drafting technology†

Pennsylvania State University,
Hazleton Campus, Hazleton
Public. F. C. Kostos, dir.
Total enrolment: 319
Technician enrolment: 180
Accreditation: MSA
Admission: Graduation from an accredited secondary school, scholastic aptitude test scores from CEEB, 2 units of algebra and/or plane geometry, 3 units of English
Electrical and electronics technology, chemical technology, drafting and design technology

Pennsylvania State University,
McKeesport Campus, University
Drive, McKeesport
Public. W. Kearney, dir.
Total enrolment: 600
Technician enrolment: 275
Accreditation: MSA
Admission: Graduation from an accredited secondary school plus CEEB scores
Electrical and electronics technology†, mechanical technology, drafting and design technology†, chemical technology

Pennsylvania State University,
Mont Alto Campus, Mont Alto
Public. Henry H. Chisman, dir.
Total enrolment: 250
Technician enrolment: 135
Admission: High-school graduation with 3 units in English and 2 units in math; SAT score required
Surveying technology, forest technology, design and drafting technology

Pennsylvania State University,
New Kensington Campus,
New Kensington
Public. E. E. Heide, dean
Total enrolment: 558
Accreditation: MSA
Electronics and electrical technology, mechanical technology

Pennsylvania State University,
Ogontz Campus, Abington 19001
Public. C. Herpel, dir.
Total enrolment: 1,999
Technician enrolment: 435
Accreditation: MSA
Admission: High-school graduation plus SAT of CEEB
Electronics and electrical technology**†, industrial technology*, computer technology*, electro-mechanical drafting technology*, electro-mechanical technology*, electronic communications technology*, electronic drafting technology*, industrial electronic technology*, drafting and design technology†, industrial drafting and design technology*, machine tool technology*, mechanical and production engineering technology*, mechanical drafting technology*

Pennsylvania State University,
Pottsville Campus, Pottsville
Public. H. I. Herring, dean
Total enrolment: 232
Accreditation: MSA
Mechanical technology, drafting and design technology†

Pennsylvania State University,
Scranton Campus, 1625 Wyoming
Avenue, Scranton 18509
Public. R. E. Dawson, dir.
Total enrolment: 258
Technician enrolment: 135
Accreditation: MSA
Admission: Upper ⅗ of graduating class, 2 yrs. of math, including algebra, SAT
Architectural drafting technology*, electrical technology*†, building construction technology, electronic drafting technology†, drafting and design technology†, industrial drafting and design technology*, industrial technology*, machine tool technology*

Pennsylvania State University,
Wilkes-Barre Campus,
Wilkes-Barre
Public. G. W. Bierly, dir.
Total enrolment: 470
Technician enrolment: 330
Accreditation: MSA
Admission: SAT, 2 yrs. of math, including algebra
Electrical technology†, drafting and design technology†, surveying technology†

Pennsylvania State University,
York Campus, 1031 Edgecomb
Ave., York 17403
Public. E. M. Elias, dir.
Total enrolment: 150
Accreditation: MSA
Admission: Upper ⅗ of graduating class, 2 yrs. of math, including algebra
Electrical and electronics technology†, drafting and design technology†, manufacturing technology†

Philco Technical Institute,
956 E. Erie Ave., Philadelphia 19134
Private. Benjamin J. Pensiero, dir.
Total enrolment: 300
Technician enrolment: 250
Admission: High-school graduation, preadmission testing
Data processing technology, computer technology, electronics technology, vending machine technology

Point Park Junior College,
201 Wood St., Pittsburgh 15222
Private. D. C. Finkelhor, pres.
Total enrolment: 2,373
Technician enrolment: 215
Accreditation: State Ed. Dept.
Admission: High-school graduation, satisfactory grades, recommendation from prin. and/or counselor, CEEB recommended
Drafting technology, electronics technology, data processing technology, computer technology, nursing

Reading Senior High School, 13th and
Douglas Streets, Reading
Public. R. P. Kyle, prin.
Total enrolment: 2,537
Technician enrolment: 40
Electrical technology**, electronics technology

Spring Garden Institute, Broad and
Spring Garden Streets, Philadelphia
19123
Private. Robert H. Thompson, pres.
Total enrolment: 211
Technician enrolment: 211
Accreditation: State Ed. Dept.
Admission: High-school graduation with 2 units of math and 2 units of science, SAT of CEEB

Building construction and design technology, chemical technology, electronics and electrical technology, mechanical engineering technology

Spring Garden Institute, Automotive Training Center, 2815 N. 17th St., Philadelphia 19132
Private. M. R. Hunter, tech. dir.
Total enrolment: 250
Technician enrolment: 215
Accreditation: State Ed. Dept.
Admission: High-school graduation and/or testing and interview
Auto-diesel technology†, automotive technology†, combustion power technology†, internal combustion (engineering) technology†

Steel Valley Technical School, 4920 Buttermilk Hollow Rd., West Mifflin 15122
Public. Nicholas A. Ventura, dir.
Total enrolment: 750
Technician enrolment: 400
Admission: Special interest in technology
Data processing technology, construction technology, electronics technology, instrumentation technology, auto-diesel technology

Technical High School, 723 Adams Avenue, Scranton
Public. W. Albert Murphy, prin.
Total enrolment: 1,509
Technician enrolment: 475
Accreditation: State Ed. Dept.
Data processing technology**, architectural drafting technology, computer technology**, electrical technology, electronics technology, nursing, auto-diesel technology**, automotive technology, internal combustion (engineering) technology, drafting technology, machine tool technology, mechanical drafting technology, printing technology, welding technology, machine and metal shop

Temple University Technical Institute and Community College, Broad St. and Columbia Ave., Philadelphia 19122
Private. William A. Schrag, dean
Total enrolment: 1,700
Accreditation: MSA
Admission: High-school graduation plus satisfactory scores on SAT of CEEB
Architectural engineering technology†, building construction technology†, electronics technology†, industrial electronics technology†, chemical technology†, mechanical technology†

Upper Bucks County Area Vocational-Technical School, M. R. 1, Schwenk Mill Rd., Perkasie 18944
Public. Nelson F. Gish, prin.
Total enrolment: 335
Technician enrolment: 57
Accreditation: MSA
Data processing technology, electrical technology, electronics technology, chemical technology, design technology

Williamsport Area Community College, 1005 W. Third St., Williamsport
Public. K. E. Carl, pres.
Total enrolment: 2,000
Technician enrolment: 900
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent and pass entrance exam
Automotive technology, electronic data processing technology, architectural drafting technology, electrical technology, electronics technology**, machine tool technology**, instrumentation technology, diesel technology, civil technology, electronic drafting technology, graphic arts technology**, airconditioning, heating, and refrigeration technology, aviation maintenance technology**, tool design technology, industrial illustration technology, mechanical drafting technology**

PUERTO RICO

Technological Institute of Puerto Rico, 33 Cesar Gonzalez Street, Industrial Zone, Hato Rey
Public. J. J. Deig, actg. dir.
Technician enrolment: 125
Admission: High-school graduation and pass entrance examination
Airconditioning and heating technology, civil technology, electronics technology**, mechanical technology

University of Puerto Rico, College of Agriculture and Mechanic Arts, College Station, Mayaguez
Public. L. Steffani, vice-chanc.
Total enrolment: 4,655
Technician enrolment: 166
Accreditation: MSA
Admission: High-school graduation and passing entrance examinations
Building construction technology, surveying and highway construction technology, metalworking technology, electrical power technology, computer technology, electronics technology, medical laboratory technology, nursing, design technology, drafting technology, mechanical technology

RHODE ISLAND

New England Technical Institute of Rhode Island, Inc., 184 Early Street, Providence 02907
Private. E. G. Earle, pres.
Technician enrolment: 246
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent (day students), electronics or mechanical background (evening students)
Electronics technology**, airconditioning, heating, and refrigeration technology**, industrial electronic technology**, architectural drafting technology, structural engineering and design technology, computer technology, electro-mechanical drafting technology, electronic communications technology**, electronic drafting technology**, medical electronic technology, instrumentation technology, design technology, drafting technology**, industrial drafting and design technology**, mechanical drafting technology**

Rhode Island Radio and Electronics School, 14 Third St., Providence 02906
Private. M. R. Reynolds, pres.
Total enrolment: 325
Technician enrolment: 325
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electronics technology, commercial broadcast technology, electronic communications technology

Roger Williams Junior College, 160 Broad St., Providence 02910
Private. Ralph E. Gauvey, pres.
Total enrolment: 701
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Construction technology, architectural drafting technology*, surveying technology*, electrical technology, drafting technology*, mechanical and production engineering technology

Vocational-Technician School of Rhode Island, Corliss Park, Providence
Public. J. Rocchio, prin.
Total enrolment: 700
Technician enrolment: 500
Admission: For extension courses, employment in areas related to instruction
Automotive technology*, electrical technology*, electronics technology*, industrial electronic technology*, machine tool technology*, sanitation technology*

SOUTH CAROLINA

ABBEVILLE HIGH SCHOOL, Abbeville
Public
Electronics technology

FLORENCE-DARLINGTON TECHNICAL EDUCATION CENTER, Box 384, Florence
Public. Fred C. Fore, dir.
Total enrolment: 744
Technician enrolment: 230
Admission: High-school graduation, aptitude tests
Agri-business technology, civil technology, surveying technology*, electronic communications technology*, electronics technology, airconditioning, heating, and refrigeration technology*, auto-diesel technology*, automotive technology*, aviation maintenance technology*, drafting technology, industrial technology, machine tool technology, welding technology

GREENVILLE TECHNICAL EDUCATION CENTER, South Pleasantburg Dr., Greenville
Public. T. E. Barton, dir.
Total enrolment: 500
Technician enrolment: 200
Admission: Qualify on the Aptitude Test Battery
Electronic data processing technology, drafting technology, electronics technology, drafting and tool design, machine tool technology, mechanical technology, instrumentation*, textile technology, chemical technology

McCLENAGHAN HIGH SCHOOL, 504 S. Dargan St., Florence
Public. J. Carlyle Lever, prin.
Total enrolment: 1,100
Accreditation: SA
Electronics technology, airconditioning, heating, and refrigeration technology, automotive technology

RICHLAND TECHNICAL EDUCATION CENTER, 316 South Beltline Blvd., Columbia 29205
Public. R. L. Grigsby, dir.
Total enrolment: 2,317
Technician enrolment: 340
Accreditation: State Ed. Dept.
Admission: Students tested and counseled prior to acceptance, must meet certain minimum scores
Civil technology**, electronic data processing technology**, drafting technology**, electronics technology**, mechanical technology**, tool and die design**, chemical technology**, computer technology*

SPARTANBURG COUNTY TECHNICAL EDUCATION CENTER, Highway I-85, P. O. Drawer 4386, Spartanburg
Public. P. D. Hull, dir.
Total enrolment: 744
Technician enrolment: 258
Accreditation: State Ed. Dept.
Admission: High-school graduation or 18 yrs. of age
Automotive technology*, airconditioning and heating technology*, drafting technology*, electronics technology, industrial electronic technology, data processing technology**, surveying technology*, industrial electronic technology*, dental technology*, metallurgical technology*, textile engineering technology, industrial drafting and design technology, industrial technology, machine shop technology*, welding and metallurgy technology*

SUMTER AREA TECHNICAL EDUCATION CENTER, Guinyard and Miller Drives, Sumter 29150
Public. W. Cecil Walters, dir.
Total enrolment: 300
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent and achievement level on battery
Automotive technology, airconditioning and heating technology, civil technology, drafting technology, electronics technology, agri-business technology, construction technology, highway technology, nursing, engineering science technology

TRI-COUNTY TECHNICAL EDUCATION CENTER, P. O. Box 87, Pendleton
Public. W. T. Yarborough, dir.
Total enrolment: 2,163
Technician enrolment: 170
Accreditation: State Ed. Dept.
Admission: Tests for placement
Drafting technology, industrial technology, electrical technology, design technology

SOUTH DAKOTA

MITCHELL INDEPENDENT SCHOOL DISTRICT #45, 117 E. 4th Ave., Mitchell 57301
Public. Robert W. McCardle, supt.
Total enrolment: 2,820
Technician enrolment: 110
Accreditation: NCA, State Ed. Dept.
Electronics technology, nursing*, machine tool technology

PRESENTATION JUNIOR COLLEGE, Aberdeen
Private. Sister M. Alicia, pres.
Total enrolment: 234
Technician enrolment: 100
Accreditation: NCA
Admission: High-school graduation, C average
Medical laboratory technology, X-ray technology

SOUTHERN STATE COLLEGE, Springfield
Public. Thomas C. Stone, dir.
Total enrolment: 730
Technician enrolment: 51
Accreditation: NCA, National Council for Acc. of Teacher Education
Admission: High-school graduation or equivalent
Industrial electronic technology, drafting technology

TENNESSEE

BELL HOUSE SCHOOL, Knoxville
Public
Electronics technology

BRISTOL TECHNICAL SCHOOL, 987 Anderson St., Bristol
Public. C. R. Marston, dir.
Total enrolment: 625
Technician enrolment: 352
Accreditation: State Ed. Dept.
Civil and construction technology*, drafting technology*, industrial electronic technology**, electrical technology*, electronic communications technology*, electronic drafting technology*, design technology**, industrial drafting and design technology**, industrial technology*, mechanical and production engineering technology*

CHATTANOOGA STATE TECHNICAL INSTITUTE, 400 Chestnut St., Chattanooga
Public. Charles O. Whitehead, dir.
Total enrolment: 250
Accreditation: State Ed. Dept.
Admission: High-school graduation
Highway technology, electrical technology, electronics technology, chemical technology, instrumentation technology, design technology, mechanical technology

CLARKSVILLE AREA TECHNICAL SCHOOL, 700 Cumberland Drive, Clarksville 37040
Public. H. Green, dir.
Total enrolment: 165
Technician enrolment: 125
Accreditation: State Ed. Dept.
Industrial electronic technology**, industrial drafting and design technology**, machine shop**

CUMBERLAND COUNTY HIGH SCHOOL, Crossville
Public. Everett L. Gibson, prin.

Total enrolment: 1,300
Technician enrolment: 25
Accreditation: State Ed. Dept.
Admission: To be enrolled in electronics must have had science, math, and algebra
Electronics technology

Ellington Technical and Vocational School, Morristown
Public
Electronics technology

Greeneville High School, Greeneville
Public
Electronics technology

Hume-Fogg Technical and Vocational High School, Nashville
Public
Electronic data processing technology

McMinn County High School, Athens
Public. B. E. Childers, prin.
Total enrolment: 1,100
Technician enrolment: 165
Accreditation: SA
Automotive technology**, electronics technology**, machine tool technology**, industrial chemistry**

Memphis Technical High School, 1266 Poplar Avenue, Memphis
Public
Chemical and metallurgical technology, data processing

Obion County Central High School, Troy
Public. James E. McKee, prin.
Total enrolment: 774
Technician enrolment: 12
Accreditation: State Ed. Dept.
Electronics technology

South Side High School, Jackson
Public
Electronics technology

Wartburg Central High School, Wartburg
Public. John R. Dillon, prin.
Total enrolment: 530
Technician enrolment: 150
Accreditation: SA
Electronics technology

TEXAS

Alvin Junior College, Alvin
Public. D. P. O'Quinn, pres.
Electronic data processing technology, mechanical drafting and design technology

Amarillo College, Amarillo
Public. A. B. Martin, pres.
Total enrolment: 2,314
Technician enrolment: 204
Accreditation: SA
Admission: High-school graduation or individual approval if over 21 yrs. of age
Chemical technology, data processing technology, electronics technology, engineering science technology, airconditioning, heating, and refrigeration technology*, automotive technology*, drafting technology

Arlington State College, Arlington
Public. J. R. Woolf, pres.
Total enrolment: 11,513
Technician enrolment: 636
Accreditation: SA
Admission: Graduation from an accredited high school, minimum of 15 acceptable units
Aeronautical technology**†, civil technology**†, electronics technology**†, mechanical technology**†

Austin Independent School District, Austin Public Schools, 701 E. 11th St., Austin
Public. H. A. Horton, Jr., dir.
Total enrolment: 9,495
Technician enrolment: 1,050
Accreditation: Texas Ed. Agency
Admission: Aptitude tests required
Automotive technology, airconditioning and heating technology, electronic data processing technology, electrical technology, machine tool technology, metallurgical technology, agri-business technology, architectural drafting technology, dental technology, medical laboratory technology, nursing, graphic arts technology, lithographic technology, drafting technology

Cisco Junior College, Rt. 3, Cisco
Public. G. C. Hogue, pres.
Total enrolment: 600
Technician enrolment: 150
Accreditation: SA, Texas Ed. Agency
Admission: High-school graduation for academic; exam for voc.-tech.
Data processing technology, architectural drafting technology, computer technology, lithographic technology, auto-diesel technology, automotive technology, internal combustion (engineering) technology, drafting technology

Cooke County Junior College, Box 815, Gainesville
Public. John H. Parker, pres.
Total enrolment: 880
Technician enrolment: 165
Accreditation: SA, Texas Ed. Agency
Admission: High-school graduation
Data processing technology, electrical technology, graphic arts technology, drafting technology, mechanical drafting technology, mechanical technology

Del Mar Junior College, Corpus Christi
Public. Grady St. Clair, pres.
Instrumentation technology, electronic communications technology, electronics technology, mechanical drafting and design technology, electronic data processing technology, electrical technology

Frank Phillips College, Borger
Public. J. W. Dillard, pres.
Total enrolment: 596
Accreditation: SA
Instrumentation

Grand Prairie Independent School District, Grand Prairie
Public
Aeronautical technology*, data processing*, electronics technology**, mechanical technology*, production technology*

Grayson County College, P. O. Box 466, Denison
Public. B. J. Dean, dir. tech.-voc. div.
Agricultural engineering technology, data processing technology, architectural drafting technology, electronics technology, industrial electronic technology, nursing, engineering science technology, auto-diesel technology, automotive technology, drafting technology, industrial drafting and design technology, machine tool technology

Greenville Independent School District, Greenville
Public
Electronics technology*, mechanical technology*

Hill Junior College, Box 619, Hillsboro
Public. W. Lamar Fly, pres.
Total enrolment: 440
Technician enrolment: 30
Accreditation: Texas Assoc. of Colleges and Univ.
Admission: High-school graduation
Medical laboratory technology, nursing, drafting technology

Henderson County Junior College, Athens
Public. Orval Pirtle, pres.
Electronics technology, mechanical drafting and design technology

Howard County Junior College, Big Spring
Public. W. A. Hunt, pres.
Total enrolment: 876
Accreditation: SA

Admission: High-school graduation or 18 yrs. old, satisfactory test scores
Electrical and electronics technology, metallurgical technology

Kilgore College, 1100 Broadway St., Kilgore
Public. Frank Zacopek, dir.
Total enrolment: 2,000
Technician enrolment: 200
Accreditation: SA
Admission: High-school graduation
Automotive technology, electronic data processing technology, drafting technology, oil and gas technology

La Marque Independent School District, La Marque
Public
Chemical and metallurgical technology*

Lamar State College, Beaumont
Public
Electronics technology, mechanical technology, mechanical drafting and design technology

Laredo Junior College, Laredo
Public. Ray A. Laird, pres.
Total enrolment: 950
Technician enrolment: 50
Accreditation: SA
Admission: High-school graduation
Data processing technology

Le Tourneau College, Longview
Private. R. H. Le Tourneau, pres.
Total enrolment: 540
Technician enrolment: 260
Admission: High-school graduation, 4 units English, 2 units social science, 1 unit nat. science, 2 units math, electives to make up 16 units
Electrical technology, mechanical technology, aviation technology

Lee College, Baytown
Public. George H. Gentry, pres.
Mechanical technology, instrumentation technology, mechanical drafting and design technology, electronic data processing technology

Lubbock Christian College, 5601 W. 19th St., Lubbock
Private. F. W. Mattox, pres.
Total enrolment: 635
Accreditation: SA
Admission: High-school graduation
Agricultural engineering technology, architectural drafting technology, electronics technology, nursing, drafting technology, machine tool technology

Navarro Junior College, P. O. Box 1170, Corsicana
Public. B. W. Jones, pres.
Total enrolment: 1,079
Technician enrolment: 150
Accreditation: SA
Admission: Graduation from accredited high school
Electronic data processing technology, electronics technology, drafting technology

Odessa College, Box 3752, Odessa
Public. J. Rodgers, pres.
Total enrolment: 2,166
Technician enrolment: 280
Accreditation: SA, Texas Ed. Agency
Admission: High-school graduation or over 21 yrs. of age
Automotive technology, electronic data processing technology, commercial broadcast technology, electronics technology*, industrial electronic technology*, nursing, airconditioning, heating, and refrigeration technology, fire-protection technology*

Prairie View Agricultural and Mechanical College, Prairie View
Public
Electronics technology

St. Philips College, San Antonio
Public. Wayland P. Moody, pres.
Mechanical technology, electronics technology, electronic data processing technology

San Angelo College, San Angelo
Public. R. M. Cavness, pres.
Electronic data processing technology

San Antonio College, San Antonio
Public. Wayland P. Moody, pres.
Electronics technology, electrical technology, electronic data processing technology

San Jacinto College, 8060 Spencer Highway, Pasadena
Public. M. M. Plexco, dean, tech. div.
Total enrolment: 2,466
Technician enrolment: 593
Accreditation: Texas Ed. Agency
Admission: High-school graduation or entrance exam
Electronic data processing technology, drafting technology, electronics technology, commercial design technology, nursing, police science

South Place Junior College, Levelland
Public
Electronic data processing technology, instrumentation technology

Southwest Texas Junior College, Uvalde
Public. Wayne Matthews, pres.
Electronic data processing technology

Technical High School and Technical Institute, 1003 W. Cannon, Fort Worth 76104
Public. G. B. Trimble, dir.
Total enrolment: 8,950
Accreditation: Texas Ed. Agency
Commercial design technology, data processing technology**, architectural drafting technology**, architectural engineering technology**, surveying technology, computer technology**, electrical technology**, electronics technology**, dental technology, nursing, ceramic technology, graphic arts technology**, lithographic technology**, airconditioning, heating, and refrigeration technology**, auto-diesel technology, automotive technology**, aviation maintenance technology, aviation technology, drafting technology**, industrial drafting and design technology**, machine tool technology**, mechanical and production engineering technology**, mechanical drafting technology**

Temple Junior College, Temple
Public. H. M. Dawson, pres.
Total enrolment: 626
Accreditation: SA
Admission: High-school graduation
Data processing

Texarkana College, Texarkana
Public. B. J. Murdock, dir. of ad. ed.
Total enrolment: 1,376
Technician enrolment: 45
Accreditation: SA
Admission: High-school graduation; adults admitted on individual approval, GEDT
Electronic data processing technology, drafting technology, architectural engineering technology, nursing

Texas A & M University, Engineering Extension Service, College Station
Public. H. D. Bearden, dir.
Total enrolment: 8,000
Technician enrolment: 1,875
Admission: High-school graduation or equivalent
Electronics technology, water utilities technology*, telephone technology*

Tyler Junior College, Tyler
Public. H. E. Jenkins, pres.
Total enrolment: 3,207
Technician enrolment: 415
Accreditation: SA
Admission: High-school graduation
Electronic data processing technology, drafting technology, petroleum technology, surveying technology, electronics technology, nursing

University of Houston, College of Technology, Houston 77004
Public. H. E. McCallick, dean
Total enrolment: 18,000
Technician enrolment: 800
Accreditation: SA
Admission: High-school graduation with specified units in math, English, etc., satisfactory SAT scores
Civil technology, drafting technology†, electrical technology†, electronics technology†, mechanical technology†, air-conditioning design technology†

University of Texas, Division of Extension, Industrial Education Department, Drawer V, Austin 78712
Public. A. J. Edward, asst. dir.
Technician enrolment: 2,159
Automotive technology*

Weatherford College, Weatherford
Public. Vernon D. Parrott, pres.
Electronic data processing technology

Wharton County Junior College, 911 Boling Highway, Wharton
Public. Travis M. McKenzie, pres.
Total enrolment: 1,515
Accreditation: SA
Admission: High-school graduation
Data processing technology, electronics technology, medical technology, automotive technology, piano technology

UTAH

Brigham Young University, College of Industrial and Technical Education, Provo
Private. E. C. Jepsen, dean
Total enrolment: 18,000
Technician enrolment: 800
Accreditation: NWA
Admission: High-school graduation or successful completion of GEDT
Civil technology, drafting technology**, electrical technology, electronics technology**, machine tool technology, welding technology, agri-business technology, commercial design technology**, building construction technology, computer technology, dental technology, medical technology, nursing, chemical technology, industrial drafting and design technology, mechanical and production technology, mechanical engineering technology, library technology**, photographic technology**

College of Eastern Utah, Price
Public. I. Longhurst, tech. division chm.
Total enrolment: 750
Technician enrolment: 65
Accreditation: NWA
Admission: High-school graduation or 18 yrs. or older
Machine tool technology, highway technology, surveying technology, electronic communications technology, automotive technology, hydraulics technology, industrial drafting and design technology

College of Southern Utah, Cedar City
Public. M. Roper, tech. division chm.
Total enrolment: 1,300
Technician enrolment: 160
Accreditation: NWA
Agri-business technology, data processing technology, architectural drafting technology, building construction technology, highway technology, computer technology, electrical technology, electronic communications technology, electronics technology, ceramic technology, automotive technology, drafting technology

Institute for Technological Training, University of Utah, Division of Continuing Education, P. O. Box 200, Salt Lake City 84110
Public. John R. Barnett, Jr., coord.
Total enrolment: 15,000
Technician enrolment: 350
Accreditation: NWA
Admission: High-school graduation
Chemical and metallurgical technology, civil technical technology, computer science technology, electronics technology, industrial technology, mechanical technology, technical writing and publishing technology

Salt Lake Trade Technical Institute, 431 S. 6th East, Salt Lake City
Public. J. L. Nelson, pres.
Total enrolment: 2,900
Technician enrolment: 500
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, entrance examination
Automotive technology, drafting technology, architectural technology, electrical technology, electronics technology, machine drafting and design, architectural drafting technology, building construction technology, civil technology, surveying technology, electronic communications technology, industrial electronic technology, nursing, graphic arts technology, lithographic technology, auto-diesel technology, industrial illustration technology, machine tool technology, mechanical and production engineering technology, mechanical drafting technology

Utah State University, Logan
Public. C. R. Bartel, chm., ind. & tech. ed. dept.
Total enrolment: 7,000
Technician enrolment: 25
Accreditation: NWA
Admission: High-school graduation or pass GEDT
Automotive technology, aeronautical technology, drafting technology, welding technology

Utah Trade Technical Institute at Provo, 1395 North 150 East, Provo 84601
Public. W. W. Sorensen, pres.
Total enrolment: 1,200
Technician enrolment: 350
Accreditation: State Ed. Dept.
Admission: High-school graduation and pass GATB for area
Airconditioning and refrigeration technology**, drafting technology**, architectural drafting technology*, electrical technology**, electro-mechanical technology**, electronics technology**, industrial electronic technology**, building construction technology**, structural engineering and design technology*, electro-mechanical drafting technology**, electronic communications technology**, electronic drafting technology**, microminiaturization technology**, dental technology, health technology, nursing, chemical technology**, graphic arts technology**, instrumentation technology**, auto-diesel technology**, automotive technology**, design technology**, fluid power (engineering) technology*, hydraulics technology*, industrial drafting and design technology**, industrial illustration technology, machine tool technology**, mechanical drafting technology**, fire-protection technology*

Weber State College, 3750 Harrison Blvd., Ogden
Public. Wendell L. Esplin, chm. tech. div.
Total enrolment: 5,291
Technician enrolment: 294
Accreditation: NWA
Admission: High-school graduation or equivalent
Automotive technology**, electronic data processing technology**, drafting technology**, electronics technology**, machine tool technology**, electronics engineering technology, auto-diesel technology**, automotive engineering technology, industrial engineering technology, manufacturing engineering technology

VERMONT

Burlington High School, 52 Institute Rd., Burlington
Public. Glenn M. Fay, prin.

Total enrolment: 1,400
Technician enrolment: 50
Accreditation: State Ed. Dept.
Drafting technology, electronics technology

Rutland Senior High School,
Library Ave., Rutland
Public. Henry L. Doll, dir.
Total enrolment: 700
Technician enrolment: 97
Accreditation: NEA
Building construction technology*, electronics technology, automotive technology*, drafting technology**, machine tool technology*, mechanical drafting technology*, metallurgical technology*, fire-protection technology*

St. Johnsbury Trade High School,
24 Western Ave., St. Johnsbury
Public. Lewis J. Streeter, prin.
Total enrolment: 203
Technician enrolment: 148
Accreditation: State Ed. Dept.
Building construction technology**, electrical technology, electronic communications technology, industrial electronic technology**, automotive technology, drafting technology, machine tool technology*, mechanical drafting technology, mechanical maintenance technology

Springfield High School, Springfield
Public. L. R. Heath, prin.
Accreditation: NEA
Electronics technology**, drafting technology*

Vermont Technical College,
Randolph Center 05061
Public. P. V. Kieffer, Jr., pres.
Total enrolment: 320
Technician enrolment: 320
Accreditation: State Ed. Dept.
Admission: Varies with technology
Dairy production technology, highway technology, electrical technology, electronics technology, design technology, mechanical and production engineering technology, instrumentation technology

VIRGINIA

Community College Division of Old Dominion College,
5215 Hampton Blvd., Norfolk 23508
Public. E. A. Kovner, dean
Total enrolment: 950
Technician enrolment: 400
Accreditation: SA
Admission: High-school graduation, 3 yrs. math and 1 yr. chemistry, satisfactory SAT scores
Airconditioning and heating technology, electronics technology, architectural engineering technology, civil technology, industrial electronic technology, chemical technology, nucleonics, industrial drafting and design technology, mechanical technology, marine engineering technology

Danville Technical Institute,
Kemper Rd., Danville
Public. L. A. Hill, dir.
Total enrolment: 350
Technician enrolment: 170
Accreditation: State Ed. Dept.
Admission: High-school graduation and at least 1 yr. algebra
Airconditioning and heating technology, electronic data processing technology, electronics technology, drafting and tool design

E. C. Glass High School, Lynchburg
Public
Electronics technology

New River Vocational-Technical School, Radford
Public. J. D. Hopkins, dir.
Total enrolment: 300
Technician enrolment: 200
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electrical technology**, electronics technology**, instrumentation technology**, industrial drafting and design technology**, machine tool technology**

Richmond Professional Institute, School of Technology,
901 W. Franklin St., Richmond 16
Public. J. Ankeney, dir.
Total enrolment: 5,200
Technician enrolment: 385
Accreditation: SA
Admission: High-school graduation, 2 yrs. high-school algebra, 1 yr. geometry, 1 yr. lab science.
Civil and highway technology, electrical and electronics technology, drafting and design technology, electronic drafting technology, air conditioning and refrigeration technology

Roanoke Technical Institute,
3098 Colonial Ave., S.W., Roanoke
Public. Hugh B. Phelps, act. dir.
Total enrolment: 332
Technician enrolment: 302
Accreditation: SA, State Ed. Dept.
Admission: High-school graduation, 3 units math, 2 units science
Civil engineering technology, electrical engineering technology, chemical engineering technology, drafting and design technology, mechanical engineering technology

Valley Vocational-Technical School, Fishersville
Public. M. M. Gray, prin.
Total enrolment: 350
Technician enrolment: 100
Accreditation: State Ed. Dept.
Admission: Passing score on GATB, 16 yrs. of age or older, science and math units required
Data processing technology, electrical technology, electronic drafting technology, electronics technology, metallurgical technology, automotive technology, design technology, drafting technology, industrial drafting and design technology, machine tool technology, mechanical drafting technology

Virginia Mechanics Institute,
1000 East Marshall, Richmond
Public. K. A. Schneider, dir.
Electronics technology*, architectural drafting technology*, electrical technology*, industrial electronic technology*, automotive technology*, mechanical drafting technology*, refrigeration technology

York High School, Adult and Technical, Yorktown
Public. J. H. Stevens, prin.
Total enrolment: 1,500
Technician enrolment: 164
Accreditation: State Ed. Dept.
Admission: High-school graduation
Electronics technology**, computer technology*, commercial broadcast technology**, electronic communications technology**, industrial electronic technology*

WASHINGTON

Bellingham Technical School,
3028 Lindberg Ave., Bellingham
Public. R. S. Smith, dir., voc. and adult ed.
Total enrolment: 200
Admission: High-school graduates who have had algebra
Automotive technology, industrial electronic technology, engineering aides

Centralia College, P. O. Box 639, Centralia 98531
Public. Boyd C. Mills, dean
Total enrolment: 1,100
Technician enrolment: 200
Accreditation: NWA
Admission: High-school graduation or 18 yrs. or older
Agri-business technology, data processing technology, civil technology, electronics technology

Clark College, 1925 Fort Vancouver Way, Vancouver
Public. D. C. Baird, pres.

Total enrolment: 1,830
Technician enrolment: 400
Accreditation: NWA
Admission: High-school graduation
Electronics technology, mechanical technology, agri-business technology, data processing technology, civil technology, highway technology, surveying technology, computer technology*, electrical technology, electronic communications technology, nursing, sanitary engineer technology, chemical technology*, graphic arts technology, metallurgical technology*, auto-diesel technology, automotive technology, drafting technology, industrial drafting and design technology, mechanical drafting technology, police science, fire-protection technology

Clover Park Education Center,
4500 Steilacoom Blvd., S.W.,
Lakewood Center 98499
Public. F. V. Miner, dir.
Total enrolment: 630
Technician enrolment: 316
Accreditation: State Ed. Dept.
Admission: By test and interview
Automotive technology, electronic data processing technology, electronics technology, computer technology*, commercial broadcast technology, medical laboratory technology, medical records technology*, nursing, X-ray technology*, aviation maintenance technology**, machine tool technology, food-processing technology

Columbia Basin College,
2600 North Chase Ave., Pasco
Public. Donald T. Rippey, pres.
Total enrolment: 2,891
Technician enrolment: 943
Accreditation: NWA
Admission: High-school graduation or equivalent
Automotive technology**, airconditioning and heating technology*, civil technology*, civil and construction technology, electronic data processing technology**, architectural drafting technology, electrical technology**, electronics technology**, industrial electronic technology**, machine tool technology**, metallurgical technology**, instrumentation**, structural engineering and design technology, nursing, industrial illustration technology, welding technology**, radiation technology*, auto body technology**

Edison Technical School,
1625 Broadway, Seattle 98122
Public. John T. Blake, prin.
Total enrolment: 11,000
Technician enrolment: 2,000
Accreditation: State Ed. Dept., NWA
Admission: High-school graduation or 18 yrs. of age
Automotive technology**, aeronautical technology**, electronic data processing technology**, drafting technology**, architectural drafting technology**, electrical technology**, electronics technology**, industrial electronic technology**, architectural engineering technology**, computer technology**, dental technology**, auto-diesel technology**

Everett Junior College,
801 Wetmore Ave., Everett 98201
Public. R. Berg, pres.
Total enrolment: 4,159
Technician enrolment: 500
Accreditation: State Ed. Dept., NWA
Admission: High-school graduation or 18 yrs. or older, or special permission of dean of students
Automotive technology**, electronic data processing technology**, electronics technology**, industrial electronic technology*, forestry technology**, surveying technology, computer technology*, electrical technology*, nursing**, forest products technology*, instrumentation technology*, metallurgical technology*, mechanical technology, welding technology**, photography**

J. M. Perry Institute of Trades, Industries and Agriculture,
2011 Washington Avenue, Yakima
Private. H. S. Buckman
Total enrolment: 180
Technician enrolment: 180
Admission: High-school graduation
Automotive technology, airconditioning and refrigeration, electrical technology, industrial electronic technology, machine technology, instrumentation

Grays Harbor College, College Heights, Aberdeen
Public. Edward P. Smith, pres.
Total enrolment: 846
Technician enrolment: 28
Accreditation: NWA
Admission: High-school graduation or 18 yrs. of age
Computer technology, electronics technology, nursing

Green River Community College,
12401 S.E. 320th St., Auburn
Public. Raymond J. Needham, dean of instruc.
Total enrolment: 900
Technician enrolment: 300
Accreditation: State Ed. Dept.
Admission: High-school graduation or special permission
Agricultural engineering technology*, civil technology**, electronics technology**, nursing, automotive technology**, design technology**, mechanical technology**, welding technology**

Highline College,
P. O. Box 66100, Seattle 98166
Public. M. A. Allan, pres.
Total enrolment: 3,200
Technician enrolment: 200
Admission: High-school graduation or 18 yrs. of age
Data processing technology, civil technology, surveying technology, computer technology, nursing**

Lower Columbia College,
Longview 98632
Public. Oliver K. Schaer, dir. of voc-tech. ed.
Total enrolment: 1,064
Technician enrolment: 265
Accreditation: NWA
Admission: High-school graduation or 18 yrs. of age; tests and prerequisites for technical curriculum
Automotive technology, electrical technology, industrial electronic technology, instrumentation technology, data processing technology, nursing, forest products technology, mechanical design technology, machine tool technology, mechanical and production engineering technology

Olympia Vocational-Technical Institute, 317 East Fourth Ave., Olympia
Public. Leslie H. Armstrong, dir.
Total enrolment: 150
Technician enrolment: 60
Accreditation: State Ed. Dept.
Admission: 18 yrs. of age, high-school graduation, or recommended by high-school principal
Civil technology, electronic data processing technology**, architectural drafting technology, electronics technology**, highways technology, agricultural engineering technology*, commercial design technology*, computer technology, dental technology, medical technology, nursing*, automotive technology*, drafting technology*, fire-protection technology*

Olympic Community College,
16th and Chester, Bremerton
Public. R. Falley, supv.
Total enrolment: 2,200
Technician enrolment: 200
Accreditation: NWA
Automotive technology*, aviation electronic technology, civil technology, civil and construction technology, electronic data processing technology, drafting

technology, electrical technology*, electro-mechanical technology*, electronics technology, industrial electronic technology, drafting and tool design, machine drafting and design, machine tool technology, mechanical design technology, mechanical technology, metallurgical technology*, instrumentation, nucleonics, printing and photo-engraving technology

PENINSULA COLLEGE, Port Angeles 98362
Public. E. John Maier, pres.
Total enrolment: 690
Technician enrolment: 60
Admission: High-school graduation
Electrical technology**, automotive technology**, drafting technology*, nursing

SAINT JOSEPH HOSPITAL, 1812 S. Eye St., Tacoma
Private. Sister Mary Emmanuel, dir.
Total enrolment: 20
Technician enrolment: 6
Accreditation: Amer. Assoc. Medical Records Lib.
Admission: High-school graduation
Medical laboratory technology, medical records technology, medical technology, nursing, X-ray technology

SHORELINE COMMUNITY COLLEGE, 16301 Greenwood Ave. N., Seattle 98133
Public. Wayne C. Johnson, dir. voc.-tech. ed.
Total enrolment: 1,800
Technician enrolment: 300
Admission: High-school graduation or 18 yrs. of age
Civil technology, electronics technology, nursing, instrumentation technology, police science

SKAGIT VALLEY COLLEGE, Mt. Vernon
Public. G. Hodson, pres.
Total enrolment: 3,925
Technician enrolment: 785
Accreditation: NWA
Admission: High-school graduation
Automotive technology, civil technology**, civil and construction technology**, drafting technology, electrical technology*, electronics technology**, metallurgical technology, instrumentation*, power technology

SPOKANE COMMUNITY COLLEGE, E. 3403 Mission, Spokane
Public. Walter S. Johnson, pres.
Total enrolment: 2,000
Technician enrolment: 1,278
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Commercial design technology, data processing technology, architectural drafting technology, building construction technology, electrical technology, electro-mechanical technology, electronics technology, microminiaturization technology, dental technology, medical records technology, nursing, graphic arts technology, instrumentation technology, lithographic technology, auto-diesel technology, aviation maintenance technology, drafting technology, industrial drafting and design technology, industrial illustration technology, machine tool technology, fire-protection technology*

TACOMA VOCATIONAL-TECHNICAL INSTITUTE, 1101 South Yakima Ave., Tacoma
Public. L. H. Bates, adm. dir.
Total enrolment: 12,621
Technician enrolment: 1,140
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, entrance examinations, personal interviews and previous school records
Civil technology**, electronic data processing technology**, drafting technology**, architectural drafting technology**, electronics technology**, industrial electronic technology**, industrial technology*, mechanical technology**, instrumentation**, architectural engineering technology**, highway technology**, structural engineering and design technology**, surveying technology**, computer technology**, commercial broadcast technology**, electrical technology**, electro-mechanical drafting technology**, electronic communications technology**, nursing*, auto-diesel technology**, automotive technology**, aviation technology*, design technology**, hydraulics technology*, industrial drafting and design technology**, industrial illustration technology**, machine tool technology*, mechanical and production engineering technology**, mechanical drafting technology**, fire-protection technology**

YAKIMA VALLEY COLLEGE, S. 16th & Lenox Aves., Yakima 98902
Public. Orville D. Carnahan, dir. of voc. tech. ed.
Total enrolment: 2,800
Technician enrolment: 250
Accreditation: NWA
Admission: High-school graduation or equivalent
Agricultural engineering technology, data processing technology, civil technology, electrical technology*, electronic communications technology, automotive technology

WEST VIRGINIA

BLUEFIELD STATE COLLEGE, Bluefield
Public. L. B. Allen, pres.
Accreditation: NCA
Total enrolment: 1,200
Technician enrolment: 200
Architectural engineering technology, electronics engineering technology, civil engineering technology, mechanical engineering technology

FAIRMONT SENIOR HIGH SCHOOL, 8th St., Fairmont
Public. E. W. Malcolm, prin.
Total enrolment: 1,250
Technician enrolment: 31
Accreditation: NCA, State Ed. Dept.
Admission: 1 yr. of algebra, IQ 110 or more, pass entrance exam
Electronics technology

HUNTINGTON EAST HIGH VOCATIONAL-TECHNICAL SCHOOL, 2800 5th Ave., Huntington
Public. D. W. Fox, dir.
Total enrolment: 300
Technician enrolment: 64
Accreditation: NCA, State Ed. Dept.
Admission: High-school graduation
Electronics technology, industrial electronic technology

LOGAN SENIOR HIGH SCHOOL, Box 1271, Logan
Public. Charles B. Harris, prin.
Total enrolment: 2,084
Technician enrolment: 57
Accreditation: NCA, State Ed. Dept.
Electronics technology, electronic communications technology, industrial electronic technology

MCKINLEY VOCATIONAL HIGH SCHOOL, 17th and Jacobs Street, Wheeling
Public. R. E. Potter, prin.
Total enrolment: 560
Technician enrolment: 50
Admission: High-school graduation for electronics
Electronics technology*, graphic arts technology, automotive technology, drafting technology, mechanical drafting technology

PARKERSBURG HIGH SCHOOL, 2101 Dudley Avenue, Parkersburg
Public. H. W. Calendine, dir.
Total enrolment: 3,000
Technician enrolment: 120
Accreditation: NCA
Electronics technology, data processing technology

RALEIGH COUNTY VOCATIONAL TECHNICAL CENTER, 229 2nd Street, Beckley
Public. J. D. Robinson, dir.
Total enrolment: 477
Technician enrolment: 47
Admission: 1 yr. of algebra. Not less than 65 percentile on aptitude tests
Electronics technology**

ST. ALBANS HIGH SCHOOL, St. Albans
Public. B. Liggett, prin.
Total enrolment: 1,360
Technician enrolment: 36
Accreditation: NCA
Chemical technology

WEST VIRGINIA INSTITUTE OF TECHNOLOGY, Montgomery
Public. L. Wood Buell, dir. of eng. tech.
Total enrolment: 1,600
Technician enrolment: 106
Accreditation: NCA
Admission: High-school graduation and rank in upper ½ of class for out-of-state students
Electrical technology, civil technology, mechanical technology, drafting and design technology

WEST VIRGINIA STATE COLLEGE, Institute
Public. W. J. L. Wallace, pres.
Total enrolment: 2,742
Technician enrolment: 91
Accreditation: NCA
Admission: High-school graduation, upper 50% of graduating class
Construction technology, electronics technology, industrial technology

WISCONSIN

APPLETON VOCATIONAL-TECHNICAL AND ADULT SCHOOL, 105 E. Kimball St., Appleton 54912
Public. C. G. Bertram, dir.
Total enrolment: 4,500
Technician enrolment: 325
Accreditation: State Ed. Dept.
Admission: High-school graduation plus entrance exam.
Electronic data processing technology, automotive technology**, drafting technology*, electrical technology**, electronic drafting technology*, electronics technology*, dental technology*, graphic arts technology, instrumentation technology*, airconditioning, heating, and refrigeration technology*, design technology*, hydraulics technology*, industrial drafting and design technology, mechanical and production engineering technology**, mechanical drafting technology*

BELOIT VOCATIONAL-TECHNICAL AND ADULT SCHOOL, Beloit
Public. R. A. Oster, dir.
Admission: High-school graduation or equivalent
Airconditioning and heating technology*, civil and construction technology*, drafting technology, electrical technology*, electronics technology**, drafting and tool design*, machine drafting and design, machine tool technology*, mechanical design technology**, mechanical technology*, metallurgical technology*, chemistry-physics technology

CUDAHY VOCATIONAL-TECHNICAL AND ADULT SCHOOL, Cudahy
Public. G. Hirsch, dir.
Electronics technology*

EAU CLAIRE VOCATIONAL-TECHNICAL AND ADULT SCHOOL, 1300 First Ave., Eau Claire 54701
Public. Cecil W. Beede, dir.
Total enrolment: 650
Technician enrolment: 375
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electrical technology, industrial electronic technology, drafting technology, machine tool technology, airconditioning and refrigeration technology

FOND DU LAC VOCATIONAL-TECHNICAL AND ADULT SCHOOL, 805 E. Johnson St., Fond du Lac
Public. H. J. Van Valkenburg, dir.
Total enrolment: 300
Technician enrolment: 150
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology, data processing technology*, industrial drafting and design technology, mechanical and production engineering technology

GREEN BAY SCHOOL OF VOCATIONAL AND ADULT EDUCATION, 200 S. Broadway, Green Bay
Public. K. W. Haubenschild, dir.
Total enrolment: 5,000
Technician enrolment: 150
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology*, civil technology**, civil and construction technology**, electronic data processing technology**, drafting technology**, architectural drafting technology**, electrical technology*, industrial electronic technology*, mechanical design technology**, mechanical technology*, printing and photoengraving technology*

JANESVILLE VOCATIONAL-TECHNICAL AND ADULT SCHOOL, 527 S. Franklin St., Janesville
Public. O. Johnson, dir.
Total enrolment: 3,300
Technician enrolment: 110
Admission: High-school graduation or equivalent
Electronic drafting technology**, automotive technology**, aviation technology**, drafting technology**, machine tool technology**

KENOSHA TECHNICAL INSTITUTE, 625 52nd St., Kenosha 53140
Public. E. Lehrmann, dir.
Total enrolment: 1,000
Technician enrolment: 500
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronic data processing technology, fluid power technology, statistical technology, industrial drafting and design technology, mechanical drafting technology

LA CROSSE VOCATIONAL-TECHNICAL AND ADULT SCHOOL, La Crosse
Public. A. F. Jordan, dir.
Mechanical technology

MADISON VOCATIONAL-TECHNICAL AND ADULT SCHOOLS, Madison 53703
Public. N. P. Mitby, dir.
Total enrolment: 13,000
Technician enrolment: 750
Accreditation: State Ed. Dept.
Admission: "C" average, high-school graduation, average intelligence or above
Automotive technology**, civil technology**, electronic data processing technology**, electronics technology**, mechanical design technology**

MANITOWOC TECHNICAL INSTITUTE, 1400 Clark St., Manitowoc 54220
Public. J. C. Ausman, dir.
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Data processing technology*, electrical technology*, electronics technology*, industrial electronic technology*, graphic arts technology**, design technology**, drafting technology**, hydraulics technology*, industrial drafting and design technology**, mechanical drafting technology**, welding technology**

MILWAUKEE INSTITUTE OF TECHNOLOGY, 1015 N. Sixth St., Milwaukee
Public. G. A. Parkinson, dir.
Total enrolment: 7,944
Technician enrolment: 3,004
Accreditation: NCA
Admission: High-school graduation or those whose eligibility has been determined by the evaluation of previous work experience, education, and an entrance examination

Automotive technology, airconditioning and heating technology, electronic data processing technology**, architectural drafting technology**, electrical technology, metallurgical technology, instrumentation, chemical technology, diesel technology, fluid power technology, commercial design technology, building construction technology**, highway technology**, structural engineering and design technology, computer technology, commercial broadcast technology, electronic communications technology, industrial electronic technology, nursing, engineering science technology, graphic arts technology, lithographic technology, design technology, mechanical and production engineering technology, mechanical drafting technology, mechanical technology, fire-protection technology, police science

Milwaukee School of Engineering, 1025 N. Milwaukee St., Milwaukee 53201
Private. K. O. Werwath, pres.
Total enrolment: 1,662
Technician enrolment: 581
Admission: High-school graduation or equivalent, units in math and science
Computer engineering technology†, electrical power engineering technology†, electronic communications engineering technology†, metallurgical engineering technology†, airconditioning engineering technology†, internal combustion engines engineering technology, fluid power engineering technology, industrial engineering technology†, chemical production engineering technology

Oshkosh Vocational, Technical and Adult Education, 228 Algoma Blvd., Oshkosh
Public. W. M. Sirek, dir.
Total enrolment: 2,000
Technician enrolment: 350
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology**, conservation technology**, industrial electronic technology**, nursing*, automotive technology**, machine tool technology**, mechanical drafting technology**†

Racine Vocational-Technical and Adult School, Racine Technical Institute, 620 Lake Ave., Racine
Public. H. M. Heigl, dir.
Total enrolment: 3,500
Technician enrolment: 400
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent, 1 yr. high-school algebra, 1 yr. chemistry or physics
Electronic data processing technology*, electrical technology*, electronics technology**, industrial electronic technology**, industrial technology**, mechanical technology** , metallurgical technology*, instrumentation*, building construction technology**, electronics technology**, hydraulics technology*, mechanical and production engineering technology**

Rice Lake School of Vocational, Technical and Adult Education, 34 S. Wilson Ave., Rice Lake
Public. James W. Covey, dir.
Total enrolment: 200
Technician enrolment: 90
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent and standardized tests
Architectural drafting technology, machine tool technology, mechanical drafting and design technology

Sheboygan School of Vocational, Technical, and Adult Education, 843 Jefferson Avenue, Sheboygan 53081
Public. F. J. Nierode, dir.
Total enrolment: 3,065
Technician enrolment: 114
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electrical technology, industrial electronic technology**, graphic arts technology, design technology

South Milwaukee Vocational, Technical, and Adult School, 1228 Michigan Ave., South Milwaukee
Public. Joseph Longo, dir.
Total enrolment: 1,700
Technician enrolment: 45
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology*, hydraulics technology*, industrial drafting and design technology*, machine tool technology*, mechanical drafting technology*

Sturgeon Bay Vocational-Technical and Adult School, Sturgeon Bay
Public. C. P. Habermann, dir.
Mechanical technology*

Superior Vocational-Technical and Adult School, 805 Belknap St., Superior 54881
Public. S. L. Lavine, dir.
Total enrolment: 1,200
Technician enrolment: 80
Accreditation: State Ed. Dept.
Admission: High-school graduation, pre-entrance tests
Automotive technology**, electronics technology, design technology

Two Rivers Vocational-Technical and Adult School, East Park St., Two Rivers
Public. C. Mayer, dir.
Total enrolment: 1,800
Technician enrolment: 95
Accreditation: State Ed. Dept.
Admission: High-school graduation or equivalent
Electronics technology, civil technology, electrical technology, automotive technology, hydraulics technology*, machine tool technology*, mechanical drafting technology*, welding technology*

Waukesha Vocational-Technical and Adult School, Waukesha
Public. A. J. Natalizio, dir.
Total enrolment: 3,200
Accreditation: State Ed. Dept.
Admission: High-school graduation
Drafting technology, architectural drafting technology, electrical technology, electronics technology, drafting and tool design, machine drafting and design, machine tool technology, mechanical technology

Wausau Technical Institute, P. O. Box 750, River Drive, Wausau
Public. L. B. Hoyt, dir.
Total enrolment: 750
Technician enrolment: 525
Accreditation: State Ed. Dept.
Admission: High-school graduation
Automotive technology**, electronic data processing technology**, drafting technology**, architectural drafting technology**, agri-business technology**, electrical technology**, electronic communications technology**, graphic arts technology**, design technology**, industrial drafting and design technology**, mechanical drafting technology**

West Allis Vocational-Technical and Adult Education, 1216 571st St., West Allis 53214
Public. V. H. Schmitt, dir.
Technician enrolment: 100-200
Admission: High-school graduation
Electrical technology**, electro-mechanical technology**, mechanical and production engineering technology**

Wisconsin Rapids Vocational-Technical and Adult School, 431 Lincoln St., Wisconsin Rapids
Public. E. Everetts, dir.
Total enrolment: 2,494
Technician enrolment: 30
Admission: High-school graduation or equivalent
Drafting technology, machine tool technology

WYOMING

Casper College, Casper
Public. T. H. Aley, pres.
Total enrolment: 725
Technician enrolment: 16
Accreditation: NCA
Admission: High-school graduation or over 21 yrs. old with completion of GEDT
Electronics technology, automotive technology, nursing

ADDENDA

West Valley College, 51 E. Campbell Ave., Campbell, California
Public. Wallace W. Hall, supt. and pres.
Total enrolment: 3,193
Accreditation: WA
Admission: High-school graduation or 18 yrs. of age or over
Data processing technology, architectural drafting technology, electronics technology, medical assisting technology, drafting technology, police science

Directory of Federal and State Officials of Technician Education

THIS directory of federal and state officials in charge of technician education has been carefully compiled from authoritative sources. Thanks are due the state directors of vocational and technical education for their cooperation.

This directory shows the person who is responsible for the technician training programs in each state, even though his title may not include the words "technical education." In many states technician education is administered under the vocational education department or the trade and industrial education department. Other states have a separate department for technician education.

Guidance counselors and other persons desiring specific information on technician education in the various states should find this directory valuable.

U. S. OFFICE OF EDUCATION
Division of Vocational and Technical Education
Washington, D. C. 20202
WALTER J. BROOKING, Technical Education Specialist
ALEXANDER C. DUCAT, Technical Education Specialist
ROBERT M. KNOEBEL, Technical Education Specialist

ALABAMA

M. O. HULSEY, Supervisor
Trade and Industrial Education
State Department of Education
Montgomery, Alabama 36104

ALASKA

EARL R. HEPLER, Director
Vocational Education
State Department of Education
326 Alaska Office Building
Juneau, Alaska 99801

ARIZONA

R. DEAN FREY, Supervisor
Technical Education
State Department of Education
412 Arizona State Building
Phoenix, Arizona 85007

ARKANSAS

J. C. RUPPERT, Director
Trade and Industrial Education
State Department of Education
Little Rock, Arkansas 72201

CALIFORNIA

WESLEY P. SMITH, Director
Vocational Education
State Department of Education
721 Capitol Mall
Sacramento, California 95814

COLORADO

LLOYD LAWSON, Section Head
Technical and Manpower Training
510 State Office Building
Denver, Colorado 80203

CONNECTICUT

LUCIAN LOMBARDI, Chief
Bureau of Technical Institutes
State Department of Education
P. O. Box 2219
Hartford, Connecticut 06115

DELAWARE

PAUL M. HODGSON, Assistant State Superintendent
Vocational-Technical Education and Extended Services
State Department of Public Instruction
P. O. Box 697
Dover, Delaware 19901

DISTRICT OF COLUMBIA

ADDISON S. HOBBS, Supervisor
Technical Education

Wormley Administration Annex No. 6
3331 Prospect Street, N. W.
Washington, D. C. 20007

FLORIDA

Thomas W. Strickland, Assistant Director
Technical Education
Division of Vocational, Technical, and Adult Education
State Department of Education
Tallahassee, Florida 32304

GEORGIA

W. M. Hicks, Supervisor
Trade and Industrial Education
State Department of Education
Atlanta, Georgia 30334

HAWAII

Albert J. Feirer, Director
Division of Vocational, Post-High and Adult Education
State Department of Education
P. O. Box 2360
Honolulu, Hawaii 96804

IDAHO

John A. McDaniel, Supervisor
Trade and Technical Education
State Board for Vocational Education
610 Main Street
Boise, Idaho 83702

ILLINOIS

Walter J. Bartz, Chief
Technical Education
Board of Vocational Education and Rehabilitation
405 Centennial Building
Springfield, Illinois 62706

INDIANA

Donald Pound, Supervisor
Trade and Industrial Education
State Department of Education
232 State House
Indianapolis, Indiana 46204

IOWA

O. H. Beaty, Supervisor
Trade and Industrial Education
State Department of Education
542 State Office Building
Des Moines, Iowa 50319

KANSAS

Myrl L. Curtis, Supervisor
Technical Training Services
State Board for Vocational Education
Topeka, Kansas 66612

KENTUCKY

Fred A. Martin, Supervisor
Trade and Industrial Education
State Department of Education
Frankfort, Kentucky 40601

LOUISIANA

T. E. Hampton, Director
Trade and Industrial Education
Division of Vocational Education
State Department of Education
2655 Plank Road
Baton Rouge, Louisiana 70804

MAINE

John A. Snell, Chief
Bureau of Vocational Education
State Department of Education
Augusta, Maine 04330

MARYLAND

James L. Reid, Director
Vocational Education
State Department of Education
Baltimore, Maryland 21201

MASSACHUSETTS

Walter J. Markham, Director
Vocational Education
State Department of Education
Boston, Massachusetts 02116

MICHIGAN

J. J. Harris, Chief
Trade and Industrial Education
Division of Vocational Education
State Department of Education
P. O. Box 928
Lansing, Michigan 48904

MINNESOTA

Robert Van Tries, Assistant Director
Vocational Education
Centennial Office Building
St. Paul, Minnesota 55101

MISSISSIPPI

A. P. Fatherree, Director
Vocational Education
State Department of Education
P. O. Box 771
Jackson, Mississippi 39205

MISSOURI

Carl S. Barber, Supervisor
Technical Education
State Department of Education
Jefferson City, Missouri 65102

MONTANA

Clarence R. Anthony, Supervisor
Technical Education
State Department of Education
Helena, Montana 59601

NEBRASKA

Cecil E. Stanley, Director
Vocational Education
State Department of Education
Lincoln, Nebraska 68509

NEVADA

Vernon L. Howard, Supervisor
Technical Education
State Department of Education
Carson City, Nevada 89701

NEW HAMPSHIRE

Earl H. Little, Chief
Division of Vocational Education and Director Technical Institutes
State Department of Education
State House Annex
Concord, New Hampshire 03302

NEW JERSEY

Nicholas F. Frigiola, Director
Technical Education
State Department of Education
Trenton, New Jersey 08625

NEW MEXICO

Henry A. Gonzales, Supervisor
Trade and Industrial Division
State Department of Education

116 South Capitol
Santa Fe, New Mexico 87501

NEW YORK

Nelson J. Murbach, Chief
Bureau of Trade and Technical Education
State Department of Education
Albany, New York 12224

NORTH CAROLINA

Ivan E. Valentine, Assistant Director
Vocational-Technical Division
State Department of Community Colleges
Raleigh, North Carolina 27602

NORTH DAKOTA

LeRoy H. Swenson, Director
Vocational Education
State Department of Education
Bismarck, North Dakota

OHIO

Byrl R. Shoemaker, Director
Vocational Education
State Department of Education
Columbus, Ohio 43215

OKLAHOMA

Arthur Lee Hardwick, Supervisor
Technical Training Services
State Board for Vocational Education
1515 West Sixth Avenue
Stillwater, Oklahoma 74074

OREGON

William G. Loomis, Director
Vocational Education
Division of Community Colleges and Vocational Education
305 Public Service Building
Salem, Oregon 97310

PENNSYLVANIA

Robert Jacoby, Supervisor
Technical and Industrial Education
State Department of Public Instruction
Harrisburg, Pennsylvania 17126

PUERTO RICO

Luis R. Ortiz, Assistant Director
Trade and Industrial Education Program
P. O. Box 818
Hato Rey, Puerto Rico 00919

RHODE ISLAND

Edward J. Medeiros, Director
Vocational Education
State Department of Education
Providence, Rhode Island 02908

SOUTH CAROLINA

G. E. McGrew, Supervisor
Trade and Industrial Education
Wade Hampton Office Building
Columbia, South Carolina 29202

SOUTH DAKOTA

E. B. Oleson, Director
Vocational and Technical Education
State Department of Public Instruction
Pierre, South Dakota

TENNESSEE

G. E. Freeman, Director
Technical Education
Cordell Hull Building
Nashville, Tennessee 37219

TEXAS

Henry E. Chitsey, Director
Technical Education and Manpower Development
Texas Education Agency
Austin, Texas 78711

UTAH

Dale E. Peterson, Specialist
Trade and Technical Education
Room 223, State Capitol Building
Salt Lake City, Utah 84114

VERMONT

Richard F. Sargent, Supervisor
Trade and Industrial Education
State Department of Education
Montpelier, Vermont 05602

VIRGINIA

L. A. Hill, Coordinator
Area Vocational-Technical Schools
State Department of Education
Richmond, Virginia 23216

WASHINGTON

Frank H. Wimer, Director
Trade and Technical Education
State Board for Vocational Education
P. O. Box 248
Olympia, Washington 98501

WEST VIRGINIA

J. Jackson Townsend, Supervisor
Vocational Industrial Education
State Department of Education
Charleston, West Virginia 25305

WISCONSIN

M. W. Bodine, Supervisor
Technical Education and MDTA
State Board of Vocational and Adult Education
Room 720, 1 West Wilson Street
Madison, Wisconsin 53702

WYOMING

Charles A. Kline, Director
Trade and Industrial and Technical Education
State Department of Education
Cheyenne, Wyoming 82001

Section 3

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Federal Legislative Developments

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Federal Legislative Developments

By Theodor Schuchat

Washington Educational Correspondent
Prakken Publications, Inc.

THE 88th Congress, which witnessed the transition from the Kennedy to the Johnson Administration, was justly hailed by the new President as "the Education Congress." In one week at the end of 1963, as "the Education Congress" was approaching the end of its first session, there came to the President's desk for his jubilant signature two major enactments, both of prime significance to technician education:

- Vocational Education Act of 1963
- Higher-Education Facilities Act of 1963

These bills had been stalemated in Congress through the spring and summer of that historic year. Two events assured their enactment. First, the dramatic demonstrations of American Negroes, protesting denial of their constitutional rights, emphasized the importance of occupational preparation and upgrading for all disadvantaged Americans. Then the assassination of President John F. Kennedy caused Congress to cooperate readily with his successor, especially when he called for swift approval of the slain President's legislative recommendations.

The origins of the Vocational Education Act of 1963 and the Higher-Education Facilities Act of 1963 were recounted in the previous edition of the YEARBOOK. At mid-summer, H.R.4955—the Perkins bill, which was ultimately to become the Vocational Education Act—had been cleared by the House Rules Committee. On August 6 it came to the floor of the House for debate. The only major issue was whether to attach an anti-discrimination requirement. Representative Alphonzo Bell (R.-Calif.) proposed such an amendment, which many Congressmen supported either because they believed in anti-discrimination measures or because they hoped this amendment would make the entire bill unacceptable to a majority of the House.

VEA Passed by Big Margin

The Bell amendment was defeated on a "teller vote" by a margin of 146 to 194. Since this type of vote does not put individual Congressmen on record, a subsequent motion called for a roll-call vote on the question, in which the Bell amendment was defeated 181-217. This was largely a party-line vote. Then the bill itself was enacted, in precisely the form proposed by the Education and Labor Committee, by a vote of 377-21, with only 9 Republicans and 12 Democrats recorded in opposition.

The Senate Labor and Public Welfare Committee, meanwhile, was considering President Kennedy's second thoughts on technical and vocational education, which were submitted on June 19 with his civil-rights proposals. The Kennedy recommendations had then been embodied in an amendment to S.580—the administration's original "omnibus" education bill—which was sponsored by Senator Wayne Morse (D.-Ore.).

The Morse amendment contained more generous fiscal provisions than the Perkins bill then before the House. In addition, the Morse amendment would have raised the percentage of funds to be earmarked for area vocational schools from 25 percent to 40 percent in the proposed law's first five years. Finally, the Morse amendment included a new proposal by President Kennedy for part-time employment of vocational-education students by educational and other nonprofit institutions. For this provision—which was not limited to students of high-school age, as President Kennedy had originally proposed—the Morse amendment would have provided $50 million in the law's first fiscal year.

The senators, Administration officials, and educators principally involved in enactment of the bill then decided to draft a new measure to put before the Senate. It would not include any provisions for higher-education facilities, since the Administration's bill, sponsored by Representative Edith Green (D.-Ore.), had been enacted by the House on August 14 but faced an uncertain reception in the Senate. However, the new bill would cover:

- Technical and vocational education, which obviously enjoyed strong approval in the House of Representatives.
- Three-year extension of the National Defense Education Act, (The Title VIII provisions for technician training would be given permanent status by the Perkins bill.)
- Three-year extension of the impacted-areas aid legislation.
- An expansion of the Library Services Act.

The major provision of this bill specifically affecting technician education was a revised definition of "area school." The language of the comparable provision in the Perkins bill, which the House had enacted, would have excluded aid to New Jersey and California, among other states.

The Strategy

Senator Morse's original strategy was to achieve enactment of this four-part bill before moving in the Senate on the pending higher-education legislation. His Education Subcommittee therefore approved the bill on September 11-12, and it came before the parent Labor and Public Welfare Committee on September 25. The Committee accepted the Subcommittee's handiwork with respect to technician education, with but one exception. Senator Winston L. Prouty (R.-Vt.) had discovered that his state would not qualify for area-school aid under the proposed language of the bill, so a bit of redrafting was done.

At this point, Senator Morse had to change his strategy and bring the four-part bill containing aid to technician education before the Senate almost simultaneously with a higher-education aid bill. The House had not yet enacted the Perkins bill, and it was clear that it would not even win the approval of the House Rules Committee and come to a vote in the House unless the Senate indicated its willingness to vote on H.R.6143, the higher-education facilities bill that had been enacted by the House.

The Senate Labor and Public Welfare Committee therefore prepared a higher-education aid bill of its own. The Green bill passed by the House would have authorized virtually unrestricted grants of construction funds to public and private institutions of higher education. Both public and private community colleges and technical institutes would have been eligible for 22 percent of the funds available in any one year. The Senate Committee bill, in contrast, would have limited construction aid to public community colleges and technical institutes. This bill was also approved by the Labor and Public Welfare Committee on September 25.

On October 7, the Senate began debating its revised version of H.R.4955, the Perkins bill. It was enacted the following day, without amendment of the technician-education provisions. The Senate enacted its higher-education legislation on October 21. By the end of that month, a Conference Committee composed of key members of both houses of Congress had been appointed and was holding its first meeting, with Senator Morse as chairman.

The Conference Committee quickly agreed on Representative Green's higher-education facilities bill. The law would authorize $50.6 million in construction grants for instructional facilities in public community colleges and technical institutes in each of three fiscal years, with the amounts of funds for the two subsequent fiscal years to be determined later. Private nonprofit two-year institutions would be aided with nearly $180 million in annual grants, for which four-year public and private nonprofit institutions would also be eligible. (See page 105 for details.)

The Conference Committee could not, however, agree on the Perkins bill for vocational education. It met fruitlessly on November 5, 6, and 7, then adjourned to await the chairman's call to reconvene.

Unless agreement could be reached on technical and vocational education, Senator Morse would not permit the higher-education facilities bill to proceed to enactment. Both measures were thus jeopardized by the failure of the House and Senate conferees to agree.

Kennedy Assassination Changes Situation

The tragic events in Dallas on November 22 altered the situation completely. The entire atmosphere immediately became one in which few Congressmen wished to withhold from the new President any bill he desired to sign. On December 3, Senator Morse called the Conference Committee together, and agreement was reached three days later.

The House bill had proposed reserving 25 percent of the funds for area schools, while the Senate bill had earmarked 40 percent of the funds for this purpose. The compromise bill set the figure at 33.3 percent. The Senate bill called for a one-year $50 million work-study program for students between 15 and 21 years of age, as well as for a one-year $15 million program of residential vocational schools. The House bill contained neither of these provisions. The compromise bill combined the work-study and residential schools provisions into one four-year program, with $30 million authorized for the 1965 fiscal year, $50 million for 1966, and $35 million for each of the two subsequent fiscal years.

Agreement on the other funds to be authorized by the bill was reached in this way:

APPROPRIATIONS AUTHORIZED BY PERKINS BILL
(in millions)

Fiscal Year	*Senate Version*	*House Version*	*Compromise Version*
1964	$108	$ 45	$ 60
1965	153	90	118.5
1966	198	135	177.5
1967 and annually thereafter	243	180	225

These funds would be in addition to all previous authorizations, including $15 million annually for technician education under Title VIII of the NDEA.

The Perkins bill faced one final hurdle: approval of the compromise by the House itself. The crucial vote came on December 12, when the bill slipped through by a vote of 180-192, with almost enough conservative Democrats voting with the bill's Republican opponents to defeat the measure. On the question of final passage, however, the vote was a top-heavy 300-65. The next day the Perkins bill was approved by the Senate, 82-4. Five days later, President Johnson proudly signed it. The Green bill had become law two days earlier.

Although these two laws went on the books at the end of the 1963 calendar year, they were signed almost at the midpoint of the 1964 fiscal year, which ended on June 30, 1964. The Administration promptly requested appropriation of the full amounts authorized for the 1964 fiscal year, but the House Appropriations Committee effectively blocked any action during the remainder of the fiscal year. During the first half of 1964, therefore, the U.S. Office of Education was unable either to issue regulations or to start expending fiscal year 1964 funds, since none were provided.

Congress Finally Appropriates Funds

For the fiscal year beginning July 1, 1964, Congress provided nearly the entire amount authorized by the new legislation. The only item deleted was $25 million for a demonstration program of residential schools. The work-study program for technician education and others was given $5 million for its initial year. For this fiscal year, also, Congress provided the full authorized amounts for the higher-education facilities program, including $50.6 million reserved for public community colleges and technical institutes.

In the spring of 1964, President Johnson requested significant changes in the Manpower Development and Training Act that would permit its funds to support technician training. Previously, the law limited training to 12 months. The administration asked Congress to permit up to 24 months of training, to make the MDTA program permanent, and to defer the requirement that federal funds be matched to some extent by state and/or local contributions.

The House-Senate Conference Committee reconciled differences between the MDTA bills enacted by their respective Houses with these results: The MDTA law will run until June 30, 1969. Full federal financing is assured through June 30, 1966, after which only one state or local dollar need be provided for every nine federal dollars for institutional training programs. There is no longer any ceiling on the amounts that Congress may appropriate for this program.

Congress also encouraged the federal administrators to provide "limited refresher or orientation training to professionals who may require such training in order to escape unemployment as a result of obsolescence of their particular specialized skills." In addition, Congress modified the statute somewhat with respect to private technician-training institutions.

Congress changed the MDTA law to permit training through public educational agencies or institutions *or*:

". . . . through arrangements with private educational or training institutions where such private institutions can provide equipment or services not available in public institutions, particularly for training in technical or subprofessional occupations, or where such institutions can, at comparable cost, (1) provide substantially equivalent training, or (2) make possible an expanded use of the individual referral method, or (3) aid in reducing more quickly unemployment or current or prospective shortages."

Thus Congress, in the past biennium, has done more to help stimulate technician education than ever before in the history of American education. The Vocational Education Act with its provisions for making permanent the technician-training provisions of Title VIII of NDEA and definition of "area vocational schools" to include technical institutes and community colleges so that they are eligible to secure a third of the $118.5 million appropriation for 1965 and $177.5 million authorization for 1966 will be of great assistance in establishing and maintaining programs.

The appropriation of $50.6 million for construction of facilities under the Higher-Education Facilities Act by community colleges and technical institutes will be a further stimulus, as will the changes in the Manpower Development and Training Act extending training to 24 months, with the federal government picking up the whole tab through 1966.

In the field of technician education as well as in other areas of education, this has been truly an "Education Congress."

Section 4

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Occupational Information

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Occupational Information about Technicians

A. Engineering and Science Technicians

THE term "technician," as used here, refers to technical workers whose jobs require knowledge and use of scientific and mathematical theory and specialized education or training in some aspect of technology or science, and who, as a rule, work directly with scientists and engineers.

However, the term "technician" has no generally accepted definition. It is used by different employers to refer to workers in a great variety of jobs, requiring a wide range of education and training. It is applied to employes doing relatively routine work, to persons performing work requiring skills within a limited sphere, and to persons doing highly technical work, such as assistants to engineers and scientists.

The workers' job titles may be descriptive of their technical level (for example, junior engineer, biological aide, or engineering technician), or their work activity (for example, quality-control technician, production analyst, tool designer, materials tester, or time-study analyst). Some employers use the word "technician" preceded by adjectives such as mechanical, electrical, electronics, or chemical, descriptive of areas of technology in which personnel are employed.

In general, the jobs of engineering and science technicians are more limited than those of the engineer or scientist, and have a greater practical orientation. Many of these technician jobs require the ability to analyze and solve engineering and science problems and prepare formal reports on experiments, tests, or other projects. Some require considerable aptitude in mathematics; others, the ability to visualize objects and to make sketches and drawings. Design jobs often require creative ability. Many technician jobs require some familiarity with one or more of the skilled trades, although not the ability to perform as a craftsman. Still others demand extensive knowledge of industrial machinery, tools, equipment, and processes. Some jobs held by these technicians are supervisory and require both technical knowledge and the ability to supervise people.

In carrying out their assignments, engineering and science technicians frequently use complex electronic and mechanical instruments, experimental laboratory apparatus, and drafting instruments. Almost all of the technicians whose jobs are described in this statement must be able to use engineering handbooks and computing devices such as the slide rule or calculating machine.

Technicians work in virtually every aspect of engineering and scientific work. Research, development,

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This report, which discusses the nature of the work of technicians in various areas, the training of technicians, and the employment outlook, is from the 1966-67 edition of the Occupational Outlook Handbook, *U.S. Department of Labor, Bureau of Labor Statistics.*

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and design work is one of the largest areas of employment. In this work they conduct experiments or tests; set up, calibrate, and operate instruments; and make calculations. They also assist scientists and engineers in developing experimental equipment and models by making drawings and sketches and, under the engineer's direction, frequently do some design work.

Technicians also work in jobs related to production, usually following a course laid out by the engineer or scientist, but often without close supervision. They may aid in the various phases of production operations, such as working out specifications for materials and methods of manufacture; devising tests to insure quality control of products; or making time and motion studies designed to improve the efficiency of a particular operation. They may also perform liaison work between engineering and production or other departments.

Technicians often do work that might otherwise have to be done by engineers. They may serve as technical sales or field representatives of manufacturers, advise on installation and maintenance problems, or work as technical writers of specifications and manuals.

Technology Areas

The following sections describe a number of areas of technology in which engineering and science technicians are trained and employed.

Aeronautical Technology. Technicians specializing in this area of technology work with engineers and scientists in many phases of the design and production of aircraft, helicopters, rockets, guided missiles, and spacecraft. Many aid engineers in preparing layouts of structures, control systems, or equipment installations by collecting information, making calculations, and performing many other tasks. They work on projects involving stress analysis, aerodynamics, structural design, flight test evaluation, or weight control. For example, under the direction of an engineer, a technician might estimate weight factors, centers of gravity, and other items affecting load capacity of an airplane or missile. Other technicians working on engineering projects prepare or check drawings for technical accuracy, practicability, and economy.

Technicians sometimes help estimate the cost of the materials and labor needed to manufacture aircraft and missiles. They may also be responsible for liaison between the engineers who do the planning and development work and the workers who convert the engineers' ideas into finished products. For example, as an airplane or missile is built, the liaison technician checks it for conformance with specifications, keeps the engineer informed as to progress, and investigates any production engineering problems that arise. He sometimes recommends minor changes in the design, the materials used, or the method of fabrication.

Other aeronautical technicians are employed as manufacturers' field service representatives, serving as the link between their employers and the military, commercial airlines, and other customers. Technicians often prepare instruction manuals, bulletins, catalogs, and other technical materials.

Airconditioning, Heating, and Refrigeration Technology. Technicians in this field often become specialists in one area of work, such as refrigeration, and sometimes in a particular type of activity, such as research and development, or design of layouts for heating, cooling, or refrigeration systems.

In the manufacture of airconditioning, heating, and refrigeration equipment, technicians work in research and engineering departments, usually as aides to engineers and scientists. They may be assigned to such jobs as devising methods for testing equipment or analyzing production methods. Technically trained personnel also assist in designing the airconditioning, heating, or refrigeration systems for a particular office, store, or other location, and in preparing instructions for their installation. In designing the layout for an airconditioning or heating system, they must determine the cooling or heating requirements, decide what kind of equipment would be best suited for the job, and estimate costs. Technical sales work for equipment manufacturers is still another area of employment for technicians. In such work, they must be able to supply contractors who design and install systems with information on such technical subjects as installation, maintenance, operating costs, and expected performance of equipment.

Chemical Technology. Technicians specializing in this area work mainly with chemists and chemical engineers in the development, production, sale, and utilization of chemical and related products and equipment. This field of chemistry is so broad that chemical technicians often become specialists in the problems of a particular industry, such as food processing, or in a particular activity, such as quality control.

Most chemical technicians work in research and development, testing, or other laboratory work. They conduct experiments and tabulate and analyze the results. In testing work, technicians make chemical tests of materials to determine whether the materials meet specifications or whether particular substances are present and, if so, in what quantities. They may, for example, analyze steel for carbon, phosphorus, and sulfur content, or water for the amount of silica, iron, and calcium present. They also perform experiments to determine the characteristics of substances such as the specific gravity and ash content of oil. Technicians employed in research or testing laboratories often assemble and use such apparatus and instruments as dilatometers (which measure the dilation or expansion of a substance), analytical balances, and centrifuges.

Outside the laboratory, chemical technicians are sometimes employed to supervise various operations in the production of chemical products and as technical salesmen of chemicals and chemical equipment.

Civil Engineering Technology. Technicians trained in this area assist civil engineers in performing many of the tasks necessary in the planning and construction of highways, railroads, bridges, viaducts, dams, and other structures. During the planning stage, technicians may help in estimating costs, preparing specifications for materials, or participate in surveying, drafting, detailing, or designing work. Once the actual construction work has begun, they may assist the contractor or superintendent in scheduling construction activities or inspecting the work to assure conformance with blueprints and specifications.

Electronics Technology. This field includes radio, radar, sonar, telemetering, television, telephony, and other forms of communication; industrial and medical measuring, recording, indicating, and controlling devices; navigational equipment; missile and spacecraft guidance and control instruments; electronic computers; and many other types of equipment using vacuum tubes and semiconductor circuits. Because the field is so broad, technicians generally become specialists in one area—for example, induction or dielectric heating, servomechanisms, automation controls, or ultrasonics.

Technicians working with engineers and scientists in the field of electronics handle complex technical work above the level involved in routine operating and repair jobs.

Industrial Technology. Technicians trained in this area are sometimes called industrial technicians or production technicians. They assist industrial engineers on problems involving the efficient use of personnel, materials, and machines in the production of goods or services. Their work includes preparing layout of machinery and equipment, planning the flow of work, and making statistical studies and analyses of production costs. The industrial technician may also conduct time-and-motion studies.

In the course of their duties, many industrial technicians acquire experience which enables them to qualify for other jobs. For example, those expert in machinery and production methods may move into the field of industrial safety. Others who specialize in job analyses may become involved in the setting of job standards and in the interviewing, testing, hiring, and training of personnel. Still others may move into production supervision.

Mechanical Technology. Mechanical technology is a broad term usually used to cover a large number of specialized fields, including automotive technology, diesel technology, tool design, machine design, and production technology.

Technicians in the above areas of technology often assist engineers in design and development work by making freehand sketches and rough layouts of proposed machinery and other equipment and parts. They help in determining whether a proposed product design change is practical and how much it will cost to produce. They may also be called on to solve design problems such as those involving tolerances, stress, strain, friction, and vibration.

Planning and carrying out tests on experimental machines and equipment for performance, durability, and efficiency is a large area of work for technicians. In the testing procedure, they record data, make computations, plot graphs, analyze results, and write reports. They sometimes make recommendations for design changes to improve performance. Their jobs often require the use of instruments, test equipment, and gages such as dynamometers, as well as the ability to prepare and interpret drawings.

Some mechanical technicians are employed in manufacturing departments to help develop plans for testing and inspecting machines and equipment, or to work with engineers in eliminating production problems. Some obtain jobs as technical salesmen.

One of the better known specialities which may be grouped under mechanical engineering technology is that of *tool designer.* The tool designer designs tools and devices for the mass production of manufactured articles. He originates and prepares sketches of the designs for cutting tools, jigs, dies, special fixtures, and other attachments used in machine operations. He may also make detailed drawings of these tools and fixtures, or supervise others in making them. Besides developing new tools, designers frequently redesign tools currently in use to improve their efficiency.

Machine drafting with some designing is another major area of work often grouped under mechanical technology.

Other Areas of Technology. Many fields of work besides those described above offer opportunities for technicians. Those in the field of *metallurgical technology,* for example, work with metallurgists and metallurgical engineers in processing metals, minerals, and ceramics and converting them into finished products. Their jobs may include testing metals and alloys to determine their physical properties, or working in research laboratories on such projects as developing new ways of treating and using metals and alloys.

Technicians in the field of *mathematics* assist mathematicians, engineers, and scientists by doing computations involving the use of algebra, logarithms, trigonometric functions, and higher mathematics. Those working in the field of *biology* assist biological scientists in conducting tests and experiments to gain knowledge about living organisms and in applying this knowledge to the solution of practical problems, such as the development of new drugs and vaccines or new varieties of plants. In *agricultural technology* technicians work with agricultural scientists in improving farm products, the quality of foods, and soil conditions. Still other fields of work for technicians include *cartography* (map making), *electrical technology* (power), *gas-turbine technology, optical technology,* and *petroleum technology*.

As industry becomes increasingly mechanized, new technical occupations continue to emerge. For example, *instrumentation technology* has evolved from the introduction of automatic controls and precision measuring devices in manufacturing operations. In industrial plants and laboratories, instruments are used to record data, to control and regulate the operation of machinery, and to measure time, weight, temperature, speeds of moving parts, mixtures, volume, flow, strain, and pressure. Technicians in this field work with the engineers and scientists who develop these highly complex devices, as well as with those who use them for research and development work.

Another new area of work for technicians, which has resulted from recognition of the need for a more scientific approach toward the reduction of industrial hazards is *safety technology.* In the rapidly growing atomic-energy field, in particular, technicians work with scientists and engineers on problems of radiation safety, inspection, and decontamination.

Where Employed

An estimated 620,000 engineering and science technicians, not including draftsmen and surveyors, were employed in mid-1964—about 12 percent were women. Nearly 475,000 of these technicians (about three-fourths of the total) were employed by private industry. The industries employing the largest numbers of engineering and science technicians are electrical equipment, machinery, chemicals, and aerospace.

In mid-1964, the federal government employed approximately 75,000 engineering and science technicians, chiefly as engineering aides and technicians, electronic technicians, equipment specialists, cartographic aides, meteorological technicians, and physical science technicians. Of these engineering and science technicians, the largest number worked for the Department of Defense. Most of the others were employed by the Departments of Agriculture, Commerce, and the Interior.

State government agencies employed over 40,000 engineering and science technicians in mid-1964, and local governments about 15,000. The remainder are employed by colleges and universities, mostly in university-operated research institutes, and by nonprofit organizations.

Training, Other Qualifications, and Advancement

Young men and women who wish to prepare for careers as engineering or science technicians can obtain the necessary training from a number of sources including specialized formal training programs offered in post-secondary schools—technical institutes, junior and community colleges, area vocational-technical schools, and extension divisions of colleges and universities—and high schools. Persons can also become qualified for technician jobs by completing an on-the-job training program, through work experience plus formal course work taken on a part-time basis in post-secondary or correspondence schools, and through training and experience obtained while serving on active duty in the Armed Forces. In addition, many engineering and science students who have not completed all requirements for a bachelor's degree, as well as some other persons with college education in mathematics and science, are able to qualify for technician jobs, providing they obtain some additional technical training and experience. In general, post-secondary school technical training is required for high-level engineering and science technician jobs.

Engineering and science technicians usually begin work as trainees or in the more routine positions under the direct and constant supervision of an experienced technician, scientist, or engineer. As they gain experience they are given more responsibility, often carrying out a particular assignment under only general supervision. Technicians may move into supervisory positions. Those with exceptional ability sometimes obtain additional formal training and are promoted to professional engineering positions.

For admittance to most schools offering post-secondary technician training, a high-school diploma is required. However, some schools admit students without a high-school diploma, if they are able to pass special examinations and otherwise demonstrate their ability to perform work above the high-school level. Because all engineering and science occupations require basic training in mathematics and science, students should obtain as good a background as possible in these subjects while in high school. A few post-secondary schools have arrangements for helping students make up deficiences in these subjects.

Programs offered by schools specializing in post-high-school technical training require one, two, or three years of full-time study. The majority are two-year programs and lead to an associate of arts or science degree. Evening as well as day sessions are generally available in many schools.

Courses in post-high-school technician programs are usually of college level. Instruction in laboratory techniques is offered as well as courses in science, mathematics, and engineering, with emphasis on the practical problems students will meet on the job. Students are taught the use of instruments and are also given instruction in the use of machinery and tools, more to give them a familiarity with the equipment than to develop skills.

Because of the variety of educational institutions offering training and the differences in the kind and level of training, persons seeking a technical education should use more than ordinary care in selecting a school. Information should be obtained about the fields of technology in which training is offered, accreditation, the length of time the school has been in operation, instructional facilities, faculty qualifications, acceptability of credits toward the bachelor's degree, and the type of work obtained by the school's graduates.

A brief discussion of some of the types of educational institutions and other sources where young people can obtain training as technicians follows.

Technical Institutes. Technical institutes offer training designed to place the graduate in a specific job or cluster of jobs immediately on graduation, and with a minimum of on-the-job training. In general, the student receives intensive technical training but less theoretical and general education than is provided in curriculums leading to a bachelor's degree in engineering and liberal arts colleges. Emphasis is placed on laboratory and practical work in order to familiarize students with techniques, and instruments and other equipment used in industry.

Some technical institutes offer cooperative programs under which a student spends part of his time in school and part in employment related to the occupation for which he is preparing himself. It may take more than two years to complete the curriculum at a school with a cooperative plan, but this type of program gives students valuable work experience, which often outweighs the disadvantages of a longer training period. In addition, students participating in cooperative programs frequently earn enough to pay for at least a part of their educational expenses, and are often able to obtain higher starting salaries on their first jobs.

Some technical institutes are operated as regular or extension divisions of colleges and universities. Others are separate institutions operated by states or municipalities, privately endowed institutions, and proprietary schools.

Junior Colleges and Community Colleges. Many junior and community colleges offer the necessary training to prepare students for technician occupations. Some of these schools offer curriculums that are equivalent to those given in the freshman and sophomore years of four-year colleges so their graduates can go either into the junior year in a four-year college or qualify for technician jobs. Others offer two-year terminal programs of the technical-institute type.

Junior-college courses in technical fields are often planned around the employment needs of the industries in their locality. The training programs for prospective technicians, therefore, vary and may include highly specialized preparation in addition to general courses. In some cases, the courses are designed to meet the specifications of one or two industries or even of a single plant.

Area Vocational-Technical Schools. Area vocational-technical schools are public institutions that are established in central locations to serve students from several surrounding areas. In the early 1960's, the number of such schools increased rapidly, primarily due to the stimulus provided by Title VIII of the National Defense Education Act of 1958. In some states, many established public junior and community colleges have been designated as area schools and have received Title VIII funds to add to their training capacity.

In general, the admission requirements of vocational-technical schools are less rigid than for other schools offering post-secondary technician training. Area-school curriculums are usually designed to train the type of technician that is in high demand in the area. In some area vocational-technical schools, training is also offered to prepare workers for skilled occupations.

Training in Industry. Some large corporations conduct training programs to meet their need for technically trained personnel. This type of training is primarily technical and rarely includes any general studies. Instruction is given both through formal classes and through training on the job. Workers who are trained wholly on the job generally get less theoretical background than those who receive formal instruction.

Other employers, aware of the need for technically trained workers but without training programs, often encourage their employes to attend evening classes in local schools or to enrol in correspondence courses. Many corporations reimburse their employes for tuition after they have completed courses satisfactorily. The workers are usually expected to take courses directly related to their work assignment, and are sometimes allowed to attend classes on the employer's time.

Training for some occupations in the technician category—tool designer and electronic technician, for example—may be obtained through a formal apprenticeship. In addition to on-the-job training, supplementary education in mathematics and science is provided. Persons interested in apprentice training may obtain further information from the local office of their state employment service, their state apprenticeship agency, the U. S. Bureau of Apprenticeship and Training, or directly from employers or the local labor union concerned with the occupation they wish to learn.

Other Training. Although most engineering and science technician jobs require post-high-school education or the equivalent in experience, a few advanced technical and technical-vocational high schools, principally in large cities, offer programs which qualify their graduates for some technician entry jobs. Graduates of this type of school, however, often need supplementary training before they can progress to higher level positions. In recent years, public high schools of this type in some states have been designated as area schools to serve several school districts and have received funds provided by Title VIII of the National Defense Education Act of 1958 to increase their training capacity.

Many technical high schools have high admission requirements and offer more thorough and advanced courses in mathematics, science, drafting, and laboratory work than are usually available in academic high schools. They sometimes offer a year of schooling beyond the twelfth grade. Some have evening courses. The courses may be organized as formal technical programs to prepare technicians or may cover only a few subjects related to a particular area of work.

Technician training in correspondence schools is taken by those who wish to learn more about their jobs or who wish to advance to a better job in the same field by increasing their theoretical and mathematical knowledge. Some correspondence school programs offer residence work in which the student receives laboratory and other practical training. Success in correspondence courses depends greatly on the ability of the student to study by himself.

Technician training is offered by all branches of the armed forces. Some trainees are given intensive short courses; others receive extensive training of a year or more. Much of the training is transferable from military to civilian jobs, and many of the technicians trained by the military establishments utilize their training in civilian employment after they leave the armed forces, especially in the field of electronics.

Employment Outlook

Employment opportunities for engineering and science technicians are expected to be very good through the mid-1970's. In recent years, technicians have been one of the fastest growing occupational groups, and it is estimated that this rapid growth will continue. In general, the demand will be strongest for graduates of post-secondary-school technician training programs to fill high-level engineering and science technician jobs.

Among the factors underlying the increase in demand for technicians are the anticipated expansion of industry and the increasing complexity of modern technology. As products and the methods by which they are manufactured become more complex, increasing numbers of technicians will probably be required to assist engineers in such activities as production planning, maintaining liaison between production and engineering departments, and technical sales work. Furthermore, as the employment of scientists and engineers continues to grow, increasing numbers of technicians will be needed to assist them. The trend toward automation of industrial processes and the growth of new areas of work, such as that related to atomic energy, will probably also add to the demand for technical personnel. In addition to the technicians needed to fill new positions, more than 15,000 will be needed each year to replace those who retire, die, or transfer to other occupations.

Another factor behind the expected increase in demand for engineering and science technicians is the growth in research and development expenditures. Such expenditures have increased very rapidly in recent years and are expected to continue to rise through the mid-1970's, although somewhat more slowly than in the past. Expenditures for the defense and space programs are also of great importance to the demand for technical personnel. The level of such expenditures is not expected to change substantially in the years ahead, and therefore the demand for technicians in defense-related work is not expected to change significantly. However, should there be a major change in expenditures for the defense and space program, the employment of engineering and science technicians will be affected accordingly.

Well qualified women technicians should continue to find favorable opportunities, chiefly in drafting jobs, in chemical and other laboratory work, and in computation and other work requiring application of mathematics. Over the long run, it is likely that more women will be trained and find employment in these and other technician occupations.

Earnings

In general, a technician's earnings depend on his education, his technical specialty, and his work experience. Other important factors which influence his earnings are the type of firm for which he works, the kind of work he does, and the geographic location of his job.

Annual starting salaries for graduates of post-high-school technical schools averaged about $5,000 in private industry in 1964. Young persons entering engineering and science technician jobs with less formal training generally earned somewhat less.

In federal government agencies in early 1965, beginning engineering and science technicians were offered $4,005, $4,480 or $5,000, depending on the type of job vacancy and the applicant's schooling and other qualifications. Some federal government agencies hire high-school graduates and train them for technician jobs. Beginning salaries for these jobs ranged from $3,680 to $4,005 a year, depending on the individual's high-school courses and experience.

Most technicians can look forward to an increase in earnings as they move to higher positions. In 1964, annual salaries of workers in high-level technician positions in private industry averaged $8,500 and approximately one-fourth earned over $9,200 a year according to a survey conducted by the Bureau of Labor Statistics.

B. Medical X-Ray Technicians

MEDICAL X-rays play a major role in the diagnostic and therapeutic field of medicine. Medical X-ray technicians—also called medical X-ray technologists—operate X-ray equipment under the direction of physicians who are usually radiologists (specialists in the use of X-rays).

Most technicians perform diagnostic work, using X-ray equipment to take pictures of internal parts of the body which the doctor wishes to examine. They may prepare a prescribed X-ray "opaque," such as barium salts, which the patient swallows in order to shade various organs to provide proper visibility in the X-ray picture. To prepare patients for X-ray, technicians position them between the X-ray tube and the film and cover body areas not to be exposed to the rays with a protective lead plate. When necessary, they set up or adjust devices to prevent the patient from moving. After determining the proper voltage, current, and desired exposure time, the technician operates the controls to obtain the pictures for interpretation by the physician.

Other technicians perform therapeutic X-ray work. They regulate special X-ray equipment used for treatment of diseases (for example, certain types of cancer). After placing the patient in the proper position, these technicians operate the equipment from an adjoining room. They may also assist radiologists by preparing radium and other radioactive materials. Some technicians are qualified to perform duties involved in both diagnostic and therapeutic X-ray work.

Medical X-ray technicians keep equipment in good working order by cleaning and making minor repairs. Other duties include processing film and keeping records of services performed for patients. Some X-ray technicians operate special equipment such as that used in diagnosing heart disease or brain damage.

Where Employed

More than one-fourth of the approximately 70,000 X-ray technicians employed in early 1965 worked in hospitals. Most of the remainder worked in medical laboratories, physicians' and dentists' offices or clinics, federal and state health agencies, and for school systems.

Most technicians work in or near large cities where medical facilities and services are concentrated. However, some are employed in hospitals and clinics in small towns or rural areas. A few work as members of small mobile X-ray teams, engaged mainly in tuberculosis detection.

About three-fourths of all X-ray technicians are women, although the number of men in the field has increased in recent years.

Training, Other Qualifications, and Advancement

Training programs in X-ray technology are conducted by hospitals or by medical schools affiliated with hospitals. In 1964, 789 schools of X-ray technology were approved by the American Medical Association (AMA). A program in X-ray technology usually takes 24 months to complete. A few schools offer three- or four-year programs and 20 schools award the bachelor's degree. Also, some junior colleges coordinate academic training with work experience in hospitals in three-year X-ray technician programs and offer an Associate of Arts degree.

In addition to training programs in approved hospital schools, some courses in X-ray technology are offered by vocational or technical schools. Training also may be obtained in the military service, or through on-the-job experience under the supervision of a radiologist.

All of the approved schools require that applicants be high-school graduates, and a few require one or two years of college or graduation from a nursing school. High-school courses in mathematics, physics, chemistry, biology, and typing are desirable. Preference is generally given to applicants between the ages of 18 and 35.

The program in X-ray technology usually includes courses in anatomy and physiology, nursing procedures, physics, radiation protection, darkroom chemistry, principles of radiographic exposure, X-ray therapy, radiographic positioning, medical ethics, department administration, and the operation and maintenance of equipment.

Registration with the American Registry of Radiologic Technologists is an asset in obtaining highly skilled and specialized positions. Registration requirements effective July 1, 1966 are to include graduation from an approved school of medical X-ray technology, and the satisfactory completion of an examination. After registration, the title, "Registered Technologist, R.T. (ARRT)" may be used.

Some technicians employed in large X-ray departments may be advanced to the job of chief X-ray technician as openings occur and may also qualify as instructors in X-ray techniques.

Good health and stamina are important qualifications in this field. Because of the possible exposure to radiation, people with a tendency toward anemia should avoid working with X-ray equipment, being relatively more susceptible to adverse effects of X-rays.

Employment Outlook

Employment opportunities for medical X-ray technicians are expected to remain excellent through the mid-1970's. In 1964, for example, the American Society of Radiologic Technologists reported that the demand for technicians was much greater than the number of persons who had completed approved courses. This situation is likely to persist during the next decade.

The increased use of X-ray equipment in the diagnosis and treatment of disease and the continuing expansion of this use are the leading factors in the expected very rapid growth of employment opportunities. In addition, more workers will be needed to help administer radiotherapy, as new knowledge of the medical benefits of radioactive material becomes more widespread. Routine X-raying of large groups of people will be extended as part of disease prevention and control programs. For example, many employers now demand that chest X-rays be taken of all employes, and most insurance companies include a chest X-ray as part of the physical examination.

In addition to medical X-ray technologists needed for new jobs, replacement demands will probably be high because of the large number of women who leave their jobs each year for marriage or family responsibilities.

Along with the increase in demand, an increase is also expected in the number of persons graduating from medical X-ray technology training programs. Nevertheless, the demand for technologists is expected to be far greater than the number of new graduates available for employment. Thus, for new graduates and for trained women who have left the field and want to return to work part-time, opportunities should be excellent through the mid-1970's.

Earnings and Working Conditions

Average salaries of medical X-ray technicians ranged from $76.50 a week in the South to $91.50 in the West according to a survey of all hospitals in mid-1963. The weekly salaries of chief X-ray technicians averaged about $116. At all levels, men generally received higher salaries than women.

New graduates of AMA-approved schools of X-ray technology, or X-ray technicians with one year of general and one year of specialized experience, were employed by the federal government at an annual salary of $4,480 in early 1965; those with no experience or specialized training, but who had passed an aptitude test, received $3,680 per year.

Full-time technicians generally work 8 hours a day, 40 hours a week, but may be "on call" for some night or emergency duty. Most are covered by the same vacation and sick-leave provisions as other workers in the same organizations.

Care must be taken to protect medical X-ray technicians from the potential hazards of radiation exposure. Precautionary measures include the use of safety devices such as individual instruments that measure radiation, lead aprons, rubber gloves, and other shieldings.

C. Dental Laboratory Technicians

ARTIFICIAL dentures—teeth, crowns, bridges, and other dental and orthodontal appliances—formerly were made by dentists. Now, dental laboratory technicians do most of this highly skilled work. These technicians do not deal directly with patients but receive prescriptions from dentists.

In making many kinds of artificial dentures, the first step is to form models in dental stone (hard plaster) from impressions of patients' mouths taken by dentists. Technicians may also make metal castings for dentures; polish and finish dentures; construct metal or porcelain crowns or inlays for partially destroyed teeth; make gold and other metal bridges; and make appliances to correct such abnormalities as cleft palates. In performing this work, dental laboratory technicians use small hand tools, special electric lathes and drills, high-heat furnaces, and other kinds of specialized laboratory equipment.

Some dental laboratory technicians do all types of dental laboratory work. Others specialize in such areas as fabricating crowns and bridges, arranging artificial teeth on dental appliances so that they function properly, processing plastic materials, working with dental ceramics (porcelain), or making castings of gold or nonprecious metal alloys used in dentistry. In beginning jobs, trainees usually perform relatively simple jobs such as mixing and pouring plaster into casts and molds. As they gain experience, they are assigned more difficult laboratory work and may use expensive metals.

Where Employed

It is estimated that about 25,000 dental laboratory technicians were employed in early 1965. Most worked in commercial laboratories, either as employes or as owners of the business. Commercial laboratories, which handle orders from any dentist, are usually one- or two-man shops. However, a few large laboratories may employ many technicians.

Approximately 3,000 dental laboratory technicians were employed by individual dentists. Some worked in hospitals that provided dental services. A few were employed by the federal government, chiefly in the Veterans Administration and in the Department of the Army. Women, who account for about 10 percent of all dental laboratory technicians, worked mainly in large commercial laboratories.

Dental laboratory technicians, like the dentists who use their services, are located mainly in cities and in the states with large populations. More than half of all dental laboratory technicians are in cities of over 50,000 population.

Training, Other Qualifications, and Advancement

Although minimum formal educational requirements prevail for entry into this occupation, graduation from high school is an asset. The most common method of becoming a dental laboratory technician is to secure a trainee position and learn the craft on the job, usually in a commercial laboratory or a hospital offering dental services. Typically, on-the-job training lasts three or four years, depending on such factors as the trainee's previous experience, his ability to master the techniques, and the number of specialized areas to be learned. Courses in dental laboratory work are now offered in some public vocational high schools and junior colleges; the course work may be taken in conjunction with the on-the-job training. Persons may also qualify by taking one- to two-year programs in dental laboratory technology offered by a few schools. Regardless of a student's educational background, employers consider actual work experience to be necessary for an applicant to qualify as a full-fledged technician.

The National Association of Dental Laboratories and the American Dental Association sponsor a certification program for dental laboratory technicians who can meet certain training and other requirements. In 1964, five schools were accredited by the American Dental Association to provide high-school graduates (or those with equivalent education) with the two years of training required under this program. Some scholarships are available in the accredited schools.

In the first year of training in accredited schools, formal classroom instruction is given in dental law and ethics, chemistry, ceramics, metallurgy, and other related subjects. During the second year, the student must complete 12 months of supervised practical experience in the school or a dental laboratory. He may receive some pay for work performed during this period. After completion of the two-year training program, three years of practical experience in a dental office or a laboratory are required before the dental laboratory technician is eligible to take the examination for certification in one or more of five areas—generalist, full denture fabrication, partial dental fabrication, ceramics, and crown and bridge fabrication.

Certification may become important for obtaining employment as a dental laboratory technician, because many employers are likely to regard the certificate as the best evidence of the technician's competence.

Among the personal qualifications which employers look for in selecting trainees are a high degree of manual dexterity, good color perception, patience, and a liking for detailed work. Preference may also be given to young people who have completed high-school courses in art, ceramics and pottery, sculpturing, blueprint reading, plastics, metalworking, and physiology.

Employment Outlook

Job opportunities for craftsmen and specialists are expected to be very good through the mid-1970's. Opportunities for trainees should also be favorable. Because growth in employment is expected to be only moderate, most openings for dental laboratory technicians will probably stem largely from the need to replace technicians who transfer to other fields of work, retire, or die.

Opportunities for salaried employment for both experienced and inexperienced dental laboratory technicians will be best in commercial laboratories and in the federal government. Some experienced technicians should also be able to establish laboratories of their own. A technician whose work has become known to several dentists in a community will have the best prospect of building a successful business.

A moderate increase in the demand for dental laboratory technicians is anticipated over the next 10 years. Among the factors underlying this expected increase are the growing awareness of the importance of preventive dentistry; the availability of new dental payment plans to help people of moderate income; and the increasing number of older people with an accompanying increase in the number of persons requiring artificial dentures. Moreover, the number of dentists is not expected to keep pace with the demand for their services; hence, in order to devote more time to treatment of patients, dentists will send more and more of their laboratory work to commercial firms.

Earnings and Working Conditions

Trained dental laboratory technicians employed in commercial laboratories in 1964 usually earned between $50 and $65 a week, according to the National Association of Dental Laboratories. Experienced technicians in commercial laboratories generally earned between $80 and $150 a week, depending on their skill level and experience. Technicians who work with ceramics or gold and other metals received the highest salaries. Foremen and managers in large dental laboratories may earn $200 or more per week. In general, net earnings of selfemployed technicians are higher than those of salaried workers.

The starting salary for dental laboratory technicians employed in the federal government was about $96 a week in early 1965. The majority of experienced dental laboratory technicians employed in the federal government earned between $106 and $128 a week.

Salaried technicians usually work the standard 40-hour week, but selfemployed technicians frequently work longer hours. Many technicians in commercial laboratories receive paid holidays and vacations, and some are also provided paid sick leave, bonuses, and other fringe benefits. Technicians employed by the federal government have the same benefits as other federal employes.

The work of dental laboratory technicians is not strenuous and most jobs can be done by handicapped workers provided they have use of their hands and fingers.

Salaries of Employed Engineering Technicians

By Theodor Schuchat

Washington Educational Correspondent,
Prakken Publications, Inc.

THE most recent comprehensive study of the pay of engineering technicians was made in February-March 1964 by the Bureau of Labor Statistics of the U. S. Department of Labor. Employers of 250 workers or more—all located in metropolitan areas—were surveyed by the Bureau, which thus gathered information about approximately 66,000 engineering technicians.

The survey's definition of engineering technicians was limited to those employes providing semiprofessional technical support to engineers engaged in such areas as research, design, development, testing, or manufacturing process improvement, and whose work pertained to electrical, electronic, or mechanical components or equipment. Technicians engaged primarily in production or maintenance work were excluded.

The technicians were classified into five levels. Engineering Technicians I, who performed simple routine tasks under close supervision or from detailed procedures, were paid monthly salaries averaging $406. Engineering Technicians II, who performed standardized or prescribed assignments involving a sequence of related operations, had average monthly salaries of $485.

Engineering Technicians V, the highest level in the survey, averaged $713 a month. That level included fully experienced technicians performing complex assignments involving responsibility for planning and conducting a complete project of relatively limited scope or a portion of a larger and more diverse project, in accordance with objectives, requirements, and design approaches outlined by the supervisor or professional engineer.

Averages for intermediate levels, Engineering Technicians III and IV, at which a majority of the technicians surveyed were classified, were $556 and $626, respectively.

Nearly all the technicians studied in the survey were employed in manufacturing (84 percent) and in the scientific services industries (12 percent).

Although the ratio of technicians to engineers was about one to five, respectively, in all the industries surveyed, a ratio of approximately two to seven was found in establishments manufacturing mechanical and electrical equipment. A ratio of one to two was noted in research, development, and testing laboratories.

This national survey is one of a continuing series. Earlier surveys indicated that the average salaries of engineering technicians rose 2.9 percent between 1962 and 1963, and 3.6 percent from 1963 to 1964. Salaries of engineering technicians were not surveyed prior to 1962.

PERCENT DISTRIBUTION OF ENGINEERING TECHNICIANS BY AVERAGE MONTHLY SALARIES
(February-March 1964)

Average monthly salaries	*Engineering technicians*				
	I	II	III	IV	V
$275 and under $300	0.2	—	—	—	—
$300 and under $325	1.8	0.1	—	—	—
$325 and under $350	11.7	1.1	—	—	—
$350 and under $375	17.6	2.8	—	—	—
$375 and under $400	15.8	4.1	(1.2)	—	—
$400 and under $425	14.0	7.1	1.9	—	—
$425 and under $450	16.4	10.4	3.7	—	—
$450 and under $475	12.5	18.8	5.3	(1.7)	—
$475 and under $500	6.7	16.2	8.0	2.5	—
$500 and under $525	2.9	13.6	12.4	3.8	(0.9)
$525 and under $550	.5	11.0	14.8	6.4	1.4
$550 and under $575	—	7.0	13.6	7.7	1.7
$575 and under $600	—	4.0	11.2	13.3	3.2
$600 and under $625	—	2.1	11.0	16.4	5.1
$625 and under $650	—	(1.6)	8.3	13.4	9.7
$650 and under $675	—	—	3.8	11.1	13.9
$675 and under $700	—	—	2.3	7.7	12.1
$700 and under $725	—	—	.8	6.0	11.0
$725 and under $750	—	—	1.1	4.5	9.6
$750 and under $775	—	—	(.7)	2.3	9.5
$775 and under $800	—	—	—	1.9	7.4
$800 and under $825	—	—	—	(1.4)	3.6
$825 and under $850	—	—	—	—	2.8
$850 and under $875	—	—	—	—	2.1
$875 and under $900	—	—	—	—	1.5
$900 and over	—	—	—	—	4.4
Number of employes	3,573	11,065	17,820	22,967	10,894
Average monthly salaries	$406	$485	$556	$626	$713

NOTE: Because of rounding, sums of individual items may not equal 100.

Section 5

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Programs, Enrolments, and Salaries

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Technician Education Programs, Enrolments, and Salaries of Graduates

THE need for educating highly skilled technicians is obvious today. The rapid growth in technician occupations is a significant trend that has been emphasized in all articles on present and future manpower needs. This growth is expected to continue.

Howard Stambler, writing on "Manpower Needs by Industry to 1975" in the U. S. Department of Labor's *Monthly Labor Review* (March and April 1965) emphasizes this growth. He writes:

> In 1963, the number of technicians (including draftsmen) working with engineers and scientists was about 825,000. It is anticipated that, by 1975, requirements for engineering and science technicians may increase by as much as two-thirds. Requirements for medical and dental technicians who work with physicians and dentists are also expected to increase considerably.
>
> The increasing emphasis on improved utilization of professional scientists, engineers, physicians, and dentists, and the need to relieve these workers of tasks which can be performed by less highly trained persons have been, and will continue to be, a factor in the increased requirements for technicians. The growth of these occupations will also result from the increasing complexity of modern technology, which has created a need for workers who have some basic scientific, mathematical, and medical knowledge and also specialized training in some aspect of technology.

The need for educating highly skilled technicians was first recognized and implemented by federal legislation with the passage of Title VIII of the National Defense Education Act of 1958. Congress, through the Act, directed the U. S. Office of Education to administer grants of funds to the states to be matched dollar for dollar to train highly skilled technicians in occupations requiring scientific knowledge in fields necessary for national defense.

In terms of number of persons served, participating institutions, breadth of offerings, and quality of offerings, the program has grown rapidly since the implementation of the Act in fiscal 1959. The success of the program was recognized by Congress and Title VIII was made a permanent part of the Vocational Education Act in 1963 as Title III of the George-Barden Act.

Statistics in this report are from the Division of Vocational and Technical Education, U.S. Office of Education. They cover only training programs under partial support from federal funds authorized by the technician-education section of the National Defense Education Act (NDEA), Title VIII (now made a permanent part of the Vocational Education Act of 1963 as Title III of the George-Barden Act). The figures do not include programs operated without federal funds nor do they include private technician-training schools.

I. Allotments and Expenditures

Allotment of Federal Funds

Fiscal year	Allotment	Released from Allotment Amount	Released from Allotment No. of States	Added to Allotment Amount	Added to Allotment No. of States
1959	$ 3,570,000	$ 584,126	20	$ 584,126	21
1960	7,000,000	620,607	12	620,607	18
1961	9,000,000	1,487,166	22	1,487,166	22
1962	12,800,000	2,818,994	23	2,700,980	21
1963	15,000,000	2,996,731	24	2,996,731	23
1964	15,000,000	1,268,610	18	1,268,610	23
1965	15,000,000				

Expenditures from Federal and Matching Funds

Fiscal year	Federal	State	Local	Total
1959	$ 2,745,995	$1,593,475	$ 2,479,156	$ 6,818,626
1960	5,968,137	2,925,395	5,132,997	14,026,529
1961	7,913,197	4,148,321	6,344,528	18,406,046
1962	11,042,875	5,456,966	8,106,010	24,605,851
1963	13,457,598	7,588,994	11,509,548	32,556,140
1964	13,596,803	8,453,204	12,856,905	34,906,912
Total	$54,724,605	$30,166,355	$46,429,144	$131,320,104

Included in the achievements of the program in fiscal 1964, as shown by the report issued by the U. S. Office of Education's Division of Vocational and Technical Education in June 1965, are the following highlights:

●More than 221,000 adults and youth were enrolled in institutions offering technical education, an increase of 236 percent since the program began in 1959.

●Programs were offered in such fields as electronic, electrical, mechanical design, chemical, metallurgical, civil and construction, mechanical production, instrumentation, nuclear, and plastics technology; and in electronic data processing, computer programing.

●In 1964 there were 881 schools offering technician training, which included public vocational and technical schools, technical institutes, community and junior colleges, state universities, and some secondary schools. This figure compares to 262 schools offering such training in 1959.

●Each year the largest enrolments are in extension courses especially designed to upgrade the skills of

II. Enrolment by Type of Program and Course

	1959	1960	1961	1962	1963	1964
Preparatory Programs:						
Secondary	4,347*	8,467	11,778	13,028	19,662	20,755
Post Secondary	14,896*	24,470	27,446	40,043	56,226	71,824
Total Preparatory Programs	19,243	32,937	39,224	53,071	75,888	92,579
Extension Courses (Total)	29,321	68,342	83,728	95,849	108,707	128,662
Total Enrolment	48,564	101,279	122,952	148,920	184,595	221,241

*Breakdown Estimated

III. NUMBER AND KINDS OF SCHOOLS

Kind of School	*Number of Schools*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*
Comprehensive High School	73	153	168	193	210	273
Vocational-Technical School	—	44	66	125	185	152
Technical High School	14	17	49	43	30	69
Vocational or Trade School	86	126	106	74	56	74
Technical Institute	17	52	25	27	49	60
Community or Junior College	38	119	126	129	162	190
Four-year College	10	16	17	26	29	45
State Board for Vocational Education	20	2	13	13	9	17
Other	4	8	—	—	—	1
Total	262	537	570	630	730	881

adult technical workers presently employed. Over 108,000 persons took advantage of such courses in fiscal year 1963, and in 1964 this figure had risen to 128,000.

●Nearly 72,000 students were enrolled in two-year post-secondary preparatory programs in 1964, an increase of more than 16,000 since 1963. More than 20,000 students were enrolled in secondary preparatory programs in 1964.

●Enrolments of women in preparatory technical-

IV. ENROLMENT BY KINDS OF SCHOOLS

Kind of School	*Preparatory Enrolment*						*Extension Enrolment*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*
Comp. H.S.	1,941	5,158	4,601	5,705	7,712	9,240	4,372	17,427	14,160	16,952	13,255	17,767
Voc.-Tech. School	—	837	4,467	7,832	14,147	12,229	—	4,471	9,404	12,172	21,681	20,902
Technical H.S.	1,224	2,634	5,968	5,568	6,781	8,722	3,735	6,970	8,494	11,567	10,418	9,154
Voc. or Tr. School	5,000	10,585	6,404	3,886	4,211	5,531	12,993	14,015	8,896	7,813	7,646	8,952
Tech. Institute	2,987	2,193	1,828	5,892	6,943	7,698	3,980	3,387	9,547	4,079	6,808	13,416
Com. or Jr. Col.	5,841	8,987	13,743	22,258	32,589	42,112	3,306	19,914	28,844	37,356	42,030	49,606
Four-Year College	1,029	2,019	1,830	1,476	2,654	6,229	106	1,135	3,692	5,447	5,960	8,035
St. Bd. for Voc. Ed.	1,093	47	383	454	851	818	829	41	691	463	909	752
Other	128	477	—	—	—	—	—	982	—	—	—	78
Total	19,243	32,937	39,224	53,071	75,888	92,579	29,321	68,342	83,728	95,849	108,707	128,662

Kind of School	*Total Enrolment*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*
Comp. H. S.	6,313	22,585	18,761	22,657	20,967	27,007
Voc.-Tech. School	—	5,308	13,871	20,004	35,828	33,131
Technical H.S.	4,949	9,604	14,462	17,135	17,199	18,953
Voc. or Tr. School	17,993	24,600	15,300	11,699	11,857	14,483
Tech. Institute	6,977	5,580	11,375	9,971	13,751	20,037
Com. or Jr. Col.	9,147	28,901	42,587	59,614	74,619	91,718
Four-Year College	1,135	3,154	5,522	6,923	8,614	14,264
St. Bd. for Voc. Ed.	1,922	88	1,074	917	1,760	1,570
Other	128	1,459	—	—	—	78
Total	48,564	101,279	122,952	148,920	184,595	221,241

V. Enrolments in Secondary and Post-Secondary Preparatory Programs by Kinds of Schools
Fiscal Years 1962, 1963, and 1964

Kind of School	*Secondary*			*Post Secondary*			*Total*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*
Comp. H. S.	4,478	6,140	7,209	1,227	1,572	2,031	5,705	7,712	9,240
Voc.-Tech. School	2,828	5,976	4,505	5,004	8,171	7,724	7,832	14,147	12,229
Technical H. S.	4,236	4,349	5,959	1,332	2,432	2,763	5,568	6,781	8,722
Voc. or Tr. School	959	1,644	2,414	2,927	2,567	3,117	3,886	4,211	5,531
Tech. Institute	97	932	468	5,795	6,011	7,230	5,892	6,943	7,698
Com. or Jr. College	356	367	91	21,902	32,222	42,021	22,258	32,589	42,112
Four-Year College	—	—	—	1,476	2,654	6,229	1,476	2,654	6,229
St. Bd. for Voc. Ed.	74	254	109	380	597	709	454	851	818
Total	13,028	19,662	20,755	40,043	56,226	71,824	53,071	75,888	92,579

VI. Number of Programs and Courses by Kinds of School

Kind of School	*Preparatory Programs*			*Extension Courses*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*
Comprehensive High School	159	197	234	329	242	375
Vocational-Technical School	234	294	358	248	489	547
Technical High School	129	98	161	179	110	157
Vocational or Trade School	107	69	93	145	85	136
Technical Institute	81	125	199	101	198	262
Community or Junior College	266	393	444	435	352	452
Four-Year College	26	42	89	60	55	85
State Board for Voc. Education	15	8	29	14	24	29
Other	—	—	—	—	—	2
Total	1,017	1,226	1,607	1,511	1,555	2,045

VII. Preparatory Programs and Enrolment by Technologies

Technology	*Number of Programs*						*Enrolment*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*
Electronics	111	231	292	447	511	651	8,230	15,695	17,723	27,495	37,292	42,846
Mechanical	78	188	249	325	392	468[1]	5,223	9,447	11,959	14,202	18,778	21,199[3]
Electrical	30	68	73	81	65	82	1,697	3,410	4,043	4,918	4,143	4,674
Aeronautical	8	9	12	11	9	10	543	661	655	385	234	311
Chemical & Metallurgical	10	28	32	48	58	75[2]	578	1,110	1,577	1,406	2,175	2,500[4]
Civil & Construction	6	25	34	57	64	96	189	795	1,090	2,194	2,617	3,337
Instrumentation	3	17	13	20	26	20	44	992	829	808	750	776
Production	7	15	11	4	26	23	264	185	924	79	4,271	1,759
Data Processing	—	8	11	19	63	156	—	63	298	1,439	5,279	14,516
Plastics	—	—	1	2	4	2	—	—	7	61	161	47
Other	38	9	4	4	8	24	2,475	579	119	84	188	614
Total	291	598	732	1,018	1,226	1,607	19,243	32,937	39,224	53,071	75,888	92,579

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[1] Mechanical 191, Drafting & Design 277

[2] Chemical 58, Metallurgical 17

[3] Mechanical 9,001, Drafting & Design 12,198

[4] Chemical 1,603, Metallurgical 897

VIII. EXTENSION COURSES AND ENROLMENT BY TECHNOLOGIES

Technology	Number of Courses						Enrolment					
	1959	1960	1961	1962	1963	1964	1959	1960	1961	1962	1963	1964
Electronics	106	317	431	587	615	787	9,622	27,739	42,243	50,451	54,621	53,349
Mechanical	31	259	278	358	407	486[1]	7,404	15,225	17,128	14,794	21,113	24,890[3]
Electrical	22	67	109	84	80	96	1,102	3,726	4,825	3,779	3,118	7,595
Aeronautical	11	15	12	26	19	18	478	1,659	831	1,972	2,734	1,991
Chem. & Metallurgical	11	56	73	86	54	88[2]	726	1,920	5,994	6,530	3,611	2,628[4]
Civil & Construction	12	33	32	70	56	105	407	945	995	2,059	2,193	6,134
Instrumentation	23	32	43	43	45	35	342	1,123	1,781	2,324	2,517	2,204
Production	11	53	61	64	84	84	527	2,147	3,310	5,402	4,240	6,737
Data Processing	—	61	141	174	176	294	—	12,626	5,693	7,656	13,444	21,249
Nucleonics	—	—	6	8	7	4	—	—	290	344	240	151
Plastics	—	—	3	6	3	5	—	—	201	338	316	403
Missiles	—	—	—	—	2	3	—	—	—	—	320	103
Other	89	12	12	5	7	40	8,713	1,232	437	200	240	1,228
Total	316	905	1,201	1,511	1,555	2,045	29,321	68,342	83,728	95,849	108,707	128,662

[1] Mechanical 310, Drafting & Design 176
[2] Chemical 42, Metallurgical 46
[3] Mechanical 16,325, Drafting & Design 8,565
[4] Chemical 1,028, Metallurgical 1,600

education programs have jumped from 473 in 1961 to 3,000 in 1963, and to 6,548 in 1964. Most of the women enrollees are in electronic and data-processing programs.

●Federal funds for technical education programs have totaled $54,724,605 since the inception of Title VIII. State and local governmental units, on a national average, have overmatched federal grants more than two to one. Federal funds paid to a state under Title VIII are used to help defray expenditures for surveys, salaries, equipment, supplies, teacher education, and certain other program costs.

●Forty-nine states, the District of Columbia, and Puerto Rico have reported graduates of vocational preparatory programs. A total of 16,347 completed preparatory curriculums. Of these graduates, 21 percent (3,427) continued their formal education and 6 percent (1,028) joined the Armed Forces.

IX. FEMALE ENROLMENT IN PREPARATORY PROGRAMS AND EXTENSION COURSES
FISCAL YEARS 1962, 1963, and 1964

Technology	Preparatory			Extension			Total Enrolment		
	1962	1963	1964	1962	1963	1964	1962	1963	1964
Electronics	539	853	748	2,065	2,462	2,064	2,604	3,315	2,812
Mechanical	129	260	373	467	734	456	596	994	829
Electrical	11	16	32	35	80	46	46	96	78
Aeronautical	—	1	1	59	46	127	59	47	128
Chem. & Metallurgical	121	180	226	91	35	34	212	215	260
Civil & Construction	13	9	18	22	67	133	35	76	151
Production	—	13	15	221	260	582	221	273	597
Instrumentation	—	4	6	—	27	25	—	31	31
Data Processing	538	1,668	5,096	2,391	4,038	5,663	2,929	5,706	10,759
Nucleonics	—	—	—	3	5	10	3	5	10
Plastics	—	—	—	6	11	1	6	11	1
Other	4	5	33	105	51	11	109	56	44
Total	1,355	3,009	6,548	5,465	7,816	9,152	6,820	10,825	15,700

X. GRADUATES FROM PREPARATORY CURRICULUMS

	Secondary School			*Post-Secondary School*			*Total*		
	**1962*	*1963*	*1964*	**1962*	*1963*	*1964*	**1962*	*1963*	*1964*
Number of Graduates	3,515	3,432	5,395	6,431	8,180	10,952	9,946	11,612	16,347
Number Not Available for Placement	1,295	1,758	2,882	2,039	1,319	2,173	3,334	3,077	5,055
Number Continuing Their Education	920	1,303	2,260	1,327	794	1,169	2,247	2,097	3,429
Number Entering Armed Forces	245	377	540	433	381	488	678	758	1,028
Other Reasons	130	78	82	279	144	516	409	222	598
Number Available for Placement	2,220	1,674	2,513	4,392	6,861	8,779	6,612	8,535	11,292
Placed in Field of Training	1,682	996	1,507	3,397	5,394	6,322	5,079	6,390	7,829
Placed in Related Field	155	131	259	298	520	1,001	444	651	1,260
Placed in Nonrelated Field	141	202	370	271	254	556	412	456	926
Number Unemployed	53	62	106	93	89	183	146	151	289
Status Unknown	189	261	244	342	546	588	531	807	832
Employed Part-time	—	22	27	—	58	129	—	80	156

*Breakdown Estimated. Graduates from secondary and post-secondary schools were not separately reported by all states.

- Of the 11,292 graduates available for placement, 70 percent were placed in the technical field for which they were trained, and 11 percent were placed in a field related to their training.

- The average starting salary paid to graduates of two-year post-secondary preparatory programs was almost $5,000 a year. This was an increase of $136 over 1963.

XI. PLACEMENT OF GRADUATES AND SALARY RANGE

				Salary Range								
	Number Placed			*Average*			*High*			*Low*		
Occupational Field	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*
Aeronautical	30	28	67	$5,870	$6,580	$5,786	$7,000	$7,000	$8,000	$3,205	$3,120	$3,800
Chem. & Metallurgical	158	136	203[1]	4,190	4,625	4,378	5,350	6,000	7,932	3,000	2,600	2,628
Civil & Construction	260	309	434	4,395	4,384	4,470	5,700	5,460	6,000	3,120	2,800	2,545
Data Processing	77	249	1,322	4,210	4,450	4,953	7,000	5,700	7,200	2,700	2,700	2,660
Electrical	244	464	665	3,840	4,490	4,555	7,300	6,000	5,572	2,400	2,400	3,225
Electronics	2,412	2,841	3,398	4,840	4,690	5,066	6,230	6,000	5,800	2,995	3,000	2,400
Instrumentation	73	77	275	4,530	5,672	4,939	5,500	6,300	5,900	3,500	4,160	3,300
Mechanical	1,542	1,278	2,319[2]	4,360	4,386	4,474	5,300	6,000	5,900	2,640	2,600	3,120
Production	208	833	371	4,275	5,245	4,341	5,790	6,475	7,200	2,815	2,600	2,600
Other	75	172	35	4,835	5,192	4,835	5,025	6,300	5,400	4,800	3,120	4,200

[1] Chemical 124, Metallurgical 79

[2] Mechanical 577, Drafting & Design 1,742.

III. NUMBER AND KINDS OF SCHOOLS

Kind of School	*Number of Schools* 1959	1960	1961	1962	1963	1964
Comprehensive High School	73	153	168	193	210	273
Vocational-Technical School	—	44	66	125	185	152
Technical High School	14	17	49	43	30	69
Vocational or Trade School	86	126	106	74	56	74
Technical Institute	17	52	25	27	49	60
Community or Junior College	38	119	126	129	162	190
Four-year College	10	16	17	26	29	45
State Board for Vocational Education	20	2	13	13	9	17
Other	4	8	—	—	—	1
Total	262	537	570	630	730	881

adult technical workers presently employed. Over 108,000 persons took advantage of such courses in fiscal year 1963, and in 1964 this figure had risen to 128,000.

- Nearly 72,000 students were enrolled in two-year post-secondary preparatory programs in 1964, an increase of more than 16,000 since 1963. More than 20,000 students were enrolled in secondary preparatory programs in 1964.
- Enrolments of women in preparatory technical-

IV. ENROLMENT BY KINDS OF SCHOOLS

Kind of School	*Preparatory Enrolment* 1959	1960	1961	1962	1963	1964	*Extension Enrolment* 1959	1960	1961	1962	1963	1964
Comp. H.S.	1,941	5,158	4,601	5,705	7,712	9,240	4,372	17,427	14,160	16,952	13,255	17,767
Voc.-Tech. School	—	837	4,467	7,832	14,147	12,229	—	4,471	9,404	12,172	21,681	20,902
Technical H.S.	1,224	2,634	5,968	5,568	6,781	8,722	3,735	6,970	8,494	11,567	10,418	9,154
Voc. or Tr. School	5,000	10,585	6,404	3,886	4,211	5,531	12,993	14,015	8,896	7,813	7,646	8,952
Tech. Institute	2,987	2,193	1,828	5,892	6,943	7,698	3,980	3,387	9,547	4,079	6,808	13,416
Com. or Jr. Col.	5,841	8,987	13,743	22,258	32,589	42,112	3,306	19,914	28,844	37,356	42,030	49,606
Four-Year College	1,029	2,019	1,830	1,476	2,654	6,229	106	1,135	3,692	5,447	5,960	8,035
St. Bd. for Voc. Ed.	1,093	47	383	454	851	818	829	41	691	463	909	752
Other	128	477	—	—	—	—	—	982	—	—	—	78
Total	19,243	32,937	39,224	53,071	75,888	92,579	29,321	68,342	83,728	95,849	108,707	128,662

Kind of School	*Total Enrolment* 1959	1960	1961	1962	1963	1964
Comp. H. S.	6,313	22,585	18,761	22,657	20,967	27,007
Voc.-Tech. School	—	5,308	13,871	20,004	35,828	33,131
Technical H.S.	4,949	9,604	14,462	17,135	17,199	18,953
Voc. or Tr. School	17,993	24,600	15,300	11,699	11,857	14,483
Tech. Institute	6,977	5,580	11,375	9,971	13,751	20,037
Com. or Jr. Col.	9,147	28,901	42,587	59,614	74,619	91,718
Four-Year College	1,135	3,154	5,522	6,923	8,614	14,264
St. Bd. for Voc. Ed.	1,922	88	1,074	917	1,760	1,570
Other	128	1,459	—	—	—	78
Total	48,564	101,279	122,952	148,920	184,595	221,241

V. Enrolments in Secondary and Post-Secondary Preparatory Programs by Kinds of Schools
Fiscal Years 1962, 1963, and 1964

Kind of School	*Secondary*			*Post Secondary*			*Total*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*
Comp. H. S.	4,478	6,140	7,209	1,227	1,572	2,031	5,705	7,712	9,240
Voc.-Tech. School	2,828	5,976	4,505	5,004	8,171	7,724	7,832	14,147	12,229
Technical H. S.	4,236	4,349	5,959	1,332	2,432	2,763	5,568	6,781	8,722
Voc. or Tr. School	959	1,644	2,414	2,927	2,567	3,117	3,886	4,211	5,531
Tech. Institute	97	932	468	5,795	6,011	7,230	5,892	6,943	7,698
Com. or Jr. College	356	367	91	21,902	32,222	42,021	22,258	32,589	42,112
Four-Year College	—	—	—	1,476	2,654	6,229	1,476	2,654	6,229
St. Bd. for Voc. Ed.	74	254	109	380	597	709	454	851	818
Total	13,028	19,662	20,755	40,043	56,226	71,824	53,071	75,888	92,579

VI. Number of Programs and Courses by Kinds of School

Kind of School	*Preparatory Programs*			*Extension Courses*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*
Comprehensive High School	159	197	234	329	242	375
Vocational-Technical School	234	294	358	248	489	547
Technical High School	129	98	161	179	110	157
Vocational or Trade School	107	69	93	145	85	136
Technical Institute	81	125	199	101	198	262
Community or Junior College	266	393	444	435	352	452
Four-Year College	26	42	89	60	55	85
State Board for Voc. Education	15	8	29	14	24	29
Other	—	—	—	—	—	2
Total	1,017	1,226	1,607	1,511	1,555	2,045

VII. Preparatory Programs and Enrolment by Technologies

Technology	*Number of Programs*						*Enrolment*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*
Electronics	111	231	292	447	511	651	8,230	15,695	17,723	27,495	37,292	42,846
Mechanical	78	188	249	325	392	468[1]	5,223	9,447	11,959	14,202	18,778	21,199[3]
Electrical	30	68	73	81	65	82	1,697	3,410	4,043	4,918	4,143	4,674
Aeronautical	8	9	12	11	9	10	543	661	655	385	234	311
Chemical & Metallurgical	10	28	32	48	58	75[2]	578	1,110	1,577	1,406	2,175	2,500[4]
Civil & Construction	6	25	34	57	64	96	189	795	1,090	2,194	2,617	3,337
Instrumentation	3	17	13	20	26	20	44	992	829	808	750	776
Production	7	15	11	4	26	23	264	185	924	79	4,271	1,759
Data Processing	—	8	11	19	63	156	—	63	298	1,439	5,279	14,516
Plastics	—	—	1	2	4	2	—	—	7	61	161	47
Other	38	9	4	4	8	24	2,475	579	119	84	188	614
Total	291	598	732	1,018	1,226	1,607	19,243	32,937	39,224	53,071	75,888	92,579

[1] Mechanical 191, Drafting & Design 277

[2] Chemical 58, Metallurgical 17

[3] Mechanical 9,001, Drafting & Design 12,198

[4] Chemical 1,603, Metallurgical 897

VIII. EXTENSION COURSES AND ENROLMENT BY TECHNOLOGIES

Technology	*Number of Courses*						*Enrolment*					
	1959	*1960*	*1961*	*1962*	*1963*	*1964*	*1959*	*1960*	*1961*	*1962*	*1963*	*1964*
Electronics	106	317	431	587	615	787	9,622	27,739	42,243	50,451	54,621	53,349
Mechanical	31	259	278	358	407	486[1]	7,404	15,225	17,128	14,794	21,113	24,890[3]
Electrical	22	67	109	84	80	96	1,102	3,726	4,825	3,779	3,118	7,595
Aeronautical	11	15	12	26	19	18	478	1,659	831	1,972	2,734	1,991
Chem. & Metallurgical	11	56	73	86	54	88[2]	726	1,920	5,994	6,530	3,611	2,628[4]
Civil & Construction	12	33	32	70	56	105	407	945	995	2,059	2,193	6,134
Instrumentation	23	32	43	43	45	35	342	1,123	1,781	2,324	2,517	2,20[illegible]
Production	11	53	61	64	84	84	527	2,147	3,310	5,402	4,240	6,737
Data Processing	—	61	141	174	176	294	—	12,626	5,693	7,656	13,444	21,249
Nucleonics	—	—	6	8	7	4	—	—	290	344	240	151
Plastics	—	—	3	6	3	5	—	—	201	338	316	403
Missiles	—	—	—	—	2	3	—	—	—	—	320	103
Other	89	12	12	5	7	40	8,713	1,232	437	200	240	1,228
Total	316	905	1,201	1,511	1,555	2,045	29,321	68,342	83,728	95,849	108,707	128,662

[1] Mechanical 310, Drafting & Design 176
[2] Chemical 42, Metallurgical 46
[3] Mechanical 16,325, Drafting & Design 8,565
[4] Chemical 1,028, Metallurgical 1,600

education programs have jumped from 473 in 1961 to 3,000 in 1963, and to 6,548 in 1964. Most of the women enrollees are in electronic and data-processing programs.

●Federal funds for technical education programs have totaled $54,724,605 since the inception of Title VIII. State and local governmental units, on a national average, have overmatched federal grants more than two to one. Federal funds paid to a state under Title VIII are used to help defray expenditures for surveys, salaries, equipment, supplies, teacher education, and certain other program costs.

●Forty-nine states, the District of Columbia, and Puerto Rico have reported graduates of vocational preparatory programs. A total of 16,347 completed preparatory curriculums. Of these graduates, 21 percent (3,427) continued their formal education and 6 percent (1,028) joined the Armed Forces.

IX. FEMALE ENROLMENT IN PREPARATORY PROGRAMS AND EXTENSION COURSES
FISCAL YEARS 1962, 1963, and 1964

Technology	*Preparatory*			*Extension*			*Total Enrolment*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*
Electronics	539	853	748	2,065	2,462	2,064	2,604	3,315	2,812
Mechanical	129	260	373	467	734	456	596	994	829
Electrical	11	16	32	35	80	46	46	96	78
Aeronautical	—	1	1	59	46	127	59	47	128
Chem. & Metallurgical	121	180	226	91	35	34	212	215	260
Civil & Construction	13	9	18	22	67	133	35	76	151
Production	—	13	15	221	260	582	221	273	597
Instrumentation	—	4	6	—	27	25	—	31	31
Data Processing	538	1,668	5,096	2,391	4,038	5,663	2,929	5,706	10,759
Nucleonics	—	—	—	3	5	10	3	5	10
Plastics	—	—	—	6	11	1	6	11	1
Other	4	5	33	105	51	11	109	56	44
Total	1,355	3,009	6,548	5,465	7,816	9,152	6,820	10,825	15,700

X. Graduates From Preparatory Curriculums

	Secondary School			Post-Secondary School			Total		
	*1962	1963	1964	*1962	1963	1964	*1962	1963	1964
Number of Graduates	3,515	3,432	5,395	6,431	8,180	10,952	9,946	11,612	16,347
Number Not Available for Placement	1,295	1,758	2,882	2,039	1,319	2,173	3,334	3,077	5,055
Number Continuing Their Education	920	1,303	2,260	1,327	794	1,169	2,247	2,097	3,429
Number Entering Armed Forces	245	377	540	433	381	488	678	758	1,028
Other Reasons	130	78	82	279	144	516	409	222	598
Number Available for Placement	2,220	1,674	2,513	4,392	6,861	8,779	6,612	8,535	11,292
Placed in Field of Training	1,682	996	1,507	3,397	5,394	6,322	5,079	6,390	7,829
Placed in Related Field	155	131	259	298	520	1,001	444	651	1,260
Placed in Nonrelated Field	141	202	370	271	254	556	412	456	926
Number Unemployed	53	62	106	93	89	183	146	151	289
Status Unknown	189	261	244	342	546	588	531	807	832
Employed Part-time	—	22	27	—	58	129	—	80	156

*Breakdown Estimated. Graduates from secondary and post-secondary schools were not separately reported by all states.

- Of the 11,292 graduates available for placement, 70 percent were placed in the technical field for which they were trained, and 11 percent were placed in a field related to their training.

- The average starting salary paid to graduates of two-year post-secondary preparatory programs was almost $5,000 a year. This was an increase of $136 over 1963.

XI. Placement of Graduates and Salary Range

				Salary Range								
	Number Placed			Average			High			Low		
Occupational Field	1962	1963	1964	1962	1963	1964	1962	1963	1964	1962	1963	1964
Aeronautical	30	28	67	$5,870	$6,580	$5,786	$7,000	$7,000	$8,000	$3,205	$3,120	$3,800
Chem. & Metallurgical	158	136	203[1]	4,190	4,625	4,378	5,350	6,000	7,932	3,000	2,600	2,628
Civil & Construction	260	309	434	4,395	4,384	4,470	5,700	5,460	6,000	3,120	2,800	2,545
Data Processing	77	249	1,322	4,210	4,450	4,953	7,000	5,700	7,200	2,700	2,700	2,660
Electrical	244	464	665	3,840	4,490	4,555	7,300	6,000	5,572	2,400	2,400	3,225
Electronics	2,412	2,841	3,398	4,840	4,690	5,066	6,230	6,000	5,800	2,995	3,000	2,400
Instrumentation	73	77	275	4,530	5,672	4,939	5,500	6,300	5,900	3,500	4,160	3,300
Mechanical	1,542	1,278	2,319[2]	4,360	4,386	4,474	5,300	6,000	5,900	2,640	2,600	3,120
Production	208	833	371	4,275	5,245	4,341	5,790	6,475	7,200	2,815	2,600	2,600
Other	75	172	35	4,835	5,192	4,835	5,025	6,300	5,400	4,800	3,120	4,200

[1] Chemical 124, Metallurgical 79

[2] Mechanical 577, Drafting & Design 1,742.

XII. SALARY RANGE OF GRADUATES (PLACED IN THEIR FIELD OF TRAINING) ACCORDING TO TYPE OF SCHOOL

	Average			*High*			*Low*		
	1962	*1963*	*1964*	*1962*	*1963*	*1964*	*1962*	*1963*	*1964*
Post Secondary	$4,935	$4,860	$4,996	$7,300	$7,000	$8,000	$2,700	$2,308	$2,545
Secondary	3,830	3,804	3,698	6,000	5,450	5,800	2,400	2,400	2,400
Both	$4,645	$4,695	$4,786	$7,300	$7,000	$8,000	$2,400	$2,308	$2,400

Section 6

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Technician-Training Aid from Higher Education Facilities Act

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Aid to Technician-Training Institutions from Higher Education Facilities Act of 1963

TECHNICIAN-TRAINING institutions—along with other institutions of higher education—can now obtain federal financial aid for construction as a result of the Higher Education Facilities Act of 1963. The act authorizes federal grants and loans to help provide buildings to house classrooms, laboratories, libraries, and research and administration facilities. It includes special provisions for community colleges and technical institutes. By making such provisions, it acknowledges the unique role of these institutions in the national scheme of post-high-school education.

The primary goal of the law is to expand enrolment capacity. The reasons for enacting it were compelling. In the technician area alone, there is urgent need to train another 600,000 highly skilled technicians by 1970. The purpose of the act is clearly declared in the following statement:

> The Congress hereby finds that the security and welfare of the United States require that this and future generations of American youth be assured ample opportunity for the fullest development of their intellectual capacity, and that this opportunity will be jeopardized unless the nation's colleges and universities are encouraged and assisted in their efforts to accommodate rapidly growing numbers of youth who aspire to a higher education. The Congress further finds and declares that these needs are so great and these steps so urgent that it is encumbent upon the nation to take positive and immediate action to meet these needs through assistance to institutions of higher education, including graduate and undergraduate institutions, junior and community colleges, and technical institutes, in providing certain academic facilities.

Title I of the Higher Education Facilities Act authorizes a five-year program of grants to construct or improve academic facilities in undergraduate colleges and universities, both public and private nonprofit. For each of the law's first three fiscal years, a $230 million appropriation is authorized. In the following two years, Congress can appropriate any amount.

Of these funds, 22 percent—or $50.6 million per year—is earmarked for public community colleges and public technical institutes which meet specified requirements. These institutions are eligible to have the federal government pay 40 percent of the cost of their improvements of academic facilities. Allocation of funds to the states is on the basis of per-capita income and the number of high-school graduates.

The remaining 78 percent of Title I funds is for grants to other institutions of higher education, including private, nonprofit, two-year institutions. Specific uses, however, are spelled out in the legislation for these grants. The funds are limited to the construction of teaching or research facilities in the natural or physical sciences, mathematics, modern foreign languages, or engineering, or for use as a library. Institutions qualifying under this section of Title I are eligible to have the government pay up to 33⅓ percent of the cost, compared to the 40 percent figure for public community colleges and technical institutes. Allocation of funds to the states is based on the proportionate higher-education enrolment and high-school enrolment in the state.

Title III of the law authorizes loans for academic facilities. The loan plus other federal funds used for the project may not exceed 75 percent of the development cost of the facility. The maximum length of time for repayment is 50 years, and the interest rate, to be set by the U. S. Commissioner of Education, must be at least ¼ percent greater than the average of all interest-bearing, public-debt obligations of the United States as of the end of the preceding fiscal year.

A $120 million appropriation is authorized for Title III for each of the law's first three years. In the following two years, Congress can appropriate any amount.

Both Title I and Title III exclude the following kinds of facilities: those to which the public will be charged admission, those designed for athletics or recreation (but not those designed for teaching physical education), those to be used for sectarian instruction or worship, those to be used primarily by a department or a school of divinity, and those to be used for a baccalaureate school of the health professions.

The U. S. Office of Education, in outlining the principal steps necessary before grants can be made to institutions under Title I of the law, points out that the first step is the establishment or designation of a state commission as required by the Act. This state commission, "broadly representative of the public and of the institutions of higher education, including junior colleges and technical institutes of the state," determines relative priorities of eligible projects and submits a priority list to the U. S. Commissioner of Education for approval.

The *state commission first submits a state plan*, which must be approved by the U. S. Commissioner, specifying the basic eligibility requirements; standards and methods for determining relative priorities of eligible projects—separating the one for public community colleges and technical institutes from the one for the other institutions; and the standards and methods of determining the federal share of the grants for each recommended project.

After this state plan is approved, eligible institutions submit their project applications directly to the state commission. The commission, on receipt of the applications, reviews the eligible projects according to the standards in its state plan and recommends to the U. S. Commissioner of Education, in order of priority, the institutions to receive matching grants and the percentage of the cost of the project to be financed from the federal matching grant.

Approval and recommendation by the state commission does not constitute a federal commitment on the project, but is a prerequisite for approval and reservation of the funds by the Commissioner of Education.

For recommended project applications which meet all requirements of the Act and of the federal regulations, the Commissioner will give tentative approval and reserve federal funds from the appropriate state allotment. He then prepares and sends to the applicant a grant award, setting forth the pertinent terms and conditions.

The next step is the acceptance of the grant offer by each institution. The accepted grant offer constitutes an agreement between the Commissioner and the applicant for the construction of the approved project and for federal participation in the cost of construction. In accordance with the terms of the accepted grant offer, construction contracts for the project then can be executed.

It should be pointed out that construction costs, as provided in the Act, include the erection of new buildings, the expansion of existing structures, the acquisition of existing structures not owned by the institution, and the rehabilitation or improvement of existing structures. Also included is the acquisition and installation of equipment, which includes machinery, utilities, built-in equipment, and all other items necessary for the building. This means furniture and furnishings, but does not include books and program materials or expendable items.

Institutions can obtain both a grant and loan on the same project, according to provisions of the Act, provided the grant and loan together do not exceed 75 percent of the total cost of the facility. If an institution is interested solely in a loan, the application is made directly to the U. S. Office of Education—that is, without going through a state commission. However, if a grant under Title I in addition to a loan under Title III is requested, the project grant application must be reviewed and recommended by the state commission.

To be eligible for either the grants or loans, the institution must, among other things, be legally authorized within the state to provide a program of education beyond the high school, be a public or other nonprofit institution, and be accredited by a nationally recognized accrediting agency or association.

Provision is made, however, that nonaccredited institutions may be included if their credits are accepted on transfer by at least three accredited institutions on the same basis as other accredited institutions. The Act also provides that the accreditation requirements will be "deemed to be satisfied" if the U. S. Commissioner of Education determines that there is satisfactory assurance that the institution will meet the requirements on completion of the proposed project and "others under construction or planned and to be commenced within a reasonable time."

Special provisions are included in the law and regulations regarding technical institutes and other institutions offering two-year technician courses. Technical institutes that have individual programs accredited by a nationally recognized accrediting agency or association will be considered to have satisfied the accreditation requirements if more than 50 percent of the full-time equivalent student enrolment of the institute is enrolled in the accredited courses.

A further provision is made for nonaccredited institutions offering two-year technician courses. If the Commissioner determines that there is no nationally recognized accreditation agency qualified to accredit such institutions, he may appoint an advisory committee qualified to evaluate the training provided by such institutions. This committee shall prescribe the standards necessary and determine whether the particular institution meets such standards.

For the 1965 fiscal year, Congress appropriated $463,150,000 for all aspects of the Higher Education Facilities Act. This included carry-over funds from the 1964 fiscal year that were not previously appropriated.

The allotment to the states under Title I of the Act for the fiscal year 1965 totaled $50,600,000 for public community colleges and public technical institutes. A state-by-state breakdown of this allotment follows:

State	*Allotment for Public Community Colleges and Technical Institutes*
Alabama	$ 1,161,234
Alaska	34,640
Arizona	441,438
Arkansas	675,760
California	3,770,269
Colorado	488,984
Connecticut	520,836
Delaware	83,580
Florida	1,371,448
Georgia	1,241,148
Hawaii	238,400
Idaho	273,453
Illinois	2,099,039
Indiana	1,329,064
Iowa	948,388
Kansas	755,571
Kentucky	910,444
Louisiana	1,112,553
Maine	327,504
Maryland	761,870
Massachusetts	1,202,327
Michigan	2,262,998
Minnesota	1,194,015
Mississippi	745,866
Missouri	1,187,717
Montana	232,825
Nebraska	457,648
Nevada	53,792
New Hampshire	176,297
New Jersey	1,330,510
New Mexico	306,493
New York	3,293,519
North Carolina	1,631,375
North Dakota	273,453
Ohio	2,543,162
Oklahoma	820,205
Oregon	582,166
Pennsylvania	3,146,597
Rhode Island	218,112
South Carolina	859,181
South Dakota	262,767
Tennessee	1,216,007
Texas	2,717,703
Utah	355,845
Vermont	138,043
Virginia	1,116,941
Washington	877,508
West Virginia	642,876
Wisconsin	1,369,176
Wyoming	101,338
District of Columbia	89,620
50 States and D.C.	$49,951,705
American Samoa	3,665
Canal Zone	— — —
Guam	19,049
Puerto Rico	616,857
Virgin Islands	8,724
Total U.S. and outlying parts	$50,600,000

Section 7

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Case Studies of Programs in Schools

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Training Radiation Technologists at Oklahoma State University Technical Institute

By Donald W. Brown

Director, Technical Institute,
Oklahoma State University,
Stillwater

TECHNOLOGICAL advancement is taking place so rapidly today that one can hardly guess what tomorrow may bring. We are all familiar with military use of atomic energy. Pictures released by the government of experimental atomic explosions and pictures of the devastation of Hiroshima and Nagasaki after the atomic bombing in World War II are startling evidence of the potential energies of atomic reactions. The peaceful uses of atomic energy are not so well-known. We are familiar with radium and its use in hospitals in the treatment of tumorous growths. Many of us wear radium-painted dials on our wristwatches, but seldom think of them as a radioactive source. Today many other radioactive materials are available for our use. The nuclear reactor has made it possible to produce man-made radioisotopes which are proving very valuable in many ways.

However, there are many more areas for the peaceful use of atomic energy which are not so well-known. The practical and peaceful use of radioisotopes is increasing daily. In agriculture, radioisotopes are used in research on plant growth, control of pests and diseases afflicting both plants and animals, the preservation of foods, the development of better fertilizers, and many other applications. Medical uses include much more than simply the therapeutic uses of X-rays and radium. Radioisotopes are used in tracer diagnostic tests for the functioning of many human organs including heart, liver, kidney, spleen, etc. Tracer tests are very useful for determining the location of tumors, especially brain tumors. Industries are using radioisotopes for tracing and gaging and testing. Wear and lubrication tests on piston rings, bearings, and other machine parts are made using radioisotopes. The flow of oil in pipe lines can be determined and small leaks detected by using radioisotopes. The inspection of welded parts is now commonly done by radiographing, a process similar to X-ray photographing. The following list shows some of the products and manufacturers using radioisotopes in the manufacturing process:

Lumber and wood products
Printing and publishing
Rubber products
Tobacco products
Fabricated metal products
Textile mill products
Apparel and related products
Food products
Petroleum products
Leather and leather goods
Furniture and fixtures

Though the use of radioactive materials is new to most industries, it is safe to say that industries will be introducing many more ways to use radioisotopes in the next few years. Using radioactive materials is safer than riding on our highways to those people trained in handling such materials. There will undoubtedly be many job opportunities with rapid advancement for the young men and women who receive training in handling, storing, and measuring radioactive sources.

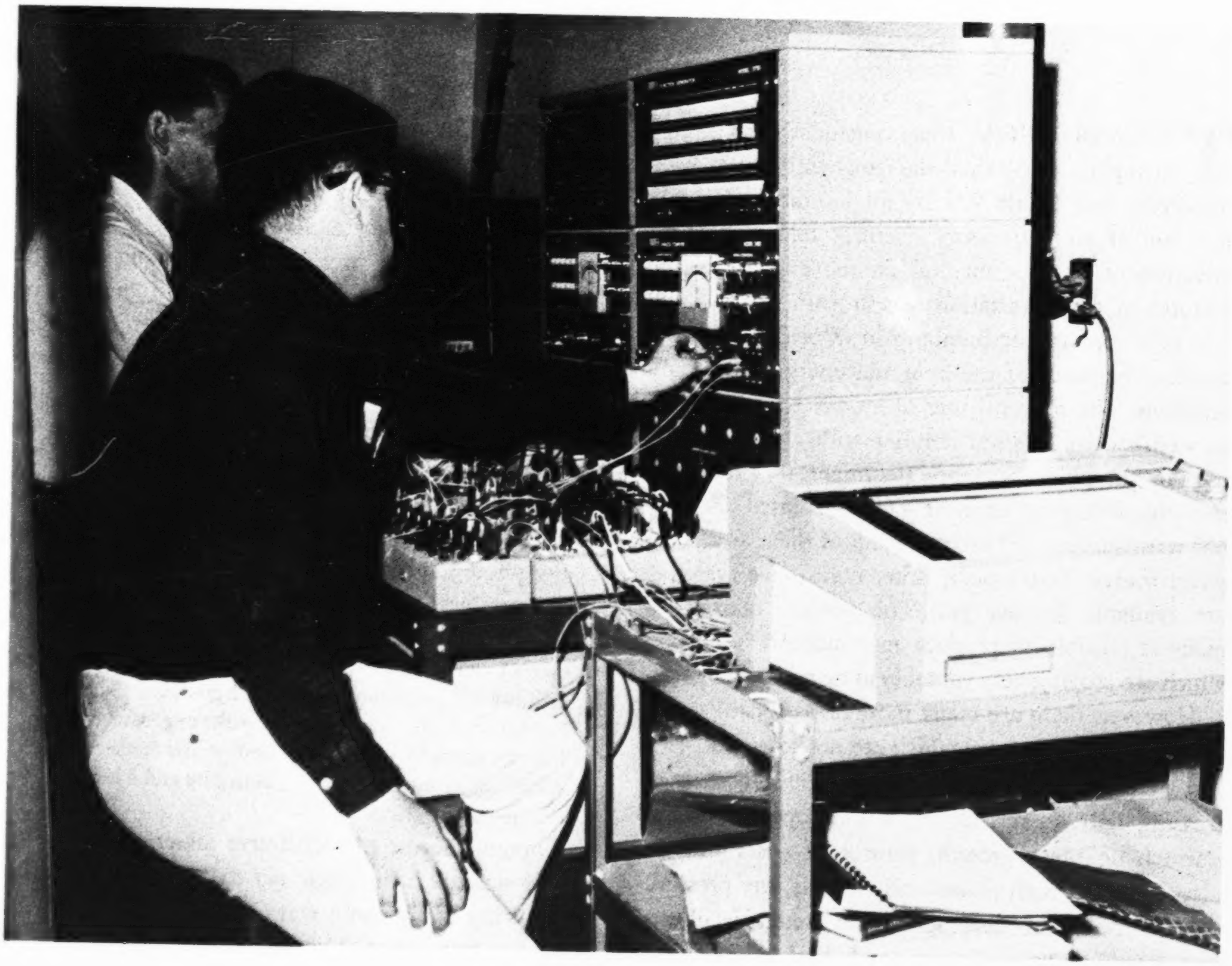
Radiation Technology Program

In view of the almost unlimited opportunities in this field, as well as the need for people trained in the use of radioactive materials, a radiological and nuclear technology program has been added to the curriculums of the Oklahoma State University technical Institute at Stillwater, Oklahoma. For brevity, this two-year program is called radiation technology. Students are awarded the Associate Degree on successful completion.

The program is partially financed by a grant from the Department of Health, Education, and Welfare, Division of Radiological Health, Washington, D.C. To help alleviate the expenses of education, a scholarship in the amount of $500 is awarded to each student enrolled in this technology. Three of the 20 students enrolled this past academic year were girls. Nine of the 98 applications for the coming fall semester are from girls. Thus, interest in the field does not appear restricted to either sex. Furthermore, the quality of applicants is high. Several of the 30 students selected have all-*A* high-school records.

The objective of this program is to prepare young men and women for interesting and profitable careers as laboratory technicians in such areas as research and development laboratories, hospitals and medical centers using radioactive materials and X-ray equipment,

Students gain experience in the use of equipment in the reactor laboratory at Oklahoma State University Technical Institute.



Graphite and other materials used in a reactor are examined.

A radiation technologist trainee at a reactor console at Stillwater.

in industries, universities, and civil-defense centers.

Students enrolling in this program work with Geiger-Mueller Beta Gamma survey meters, Gamma scintillation scalers, dosimeters, X-ray equipment, radionuclides, oscilloscopes, vacuum-tube voltmeters, and other equipment including chemical, biological, and electrical apparatus.

The Curriculum

First Semester	*Theory*	*Lab*	*Credit*
Basic Applied Chemistry	3	3	4
Algebra and Trigonometry	5	0	5
Personal and Occupational Guidance	1	0	1
History and Fundamentals of Radiation	3	3	4
Basic Writing Skills	3	0	3
			17
Second Semester			
Essentials of Electronics	3	3	4
Applied Modern Physics	3	3	4
Essentials of Electricity	3	3	4
Statistics	1	3	2
Public-Health Aspects of Radiation	3	0	3
			17
Summer Session (optional)			
Technological Practice			
Third Semester			
Environmental Radiation Fundamentals	3	3	4
Radiological Health I	3	3	4
Radiation Measurements	3	6	5
Challenges in American Democratic Life	4	0	4
			17
Fourth Semester			
American Industrial Development	2	0	2
Radiation Biology	3	6	5
Special Problems	1	3	2
X-ray Radiation	3	3	4
Radiological Health II	3	3	4
			17

Placement Opportunities Excellent

Graduates with this background and training should be capable of serving in such positions as radiation-safety technicians, reactor operator trainees, hospital-laboratory technicians, radiation technicians assisting scientists and research personnel in industry and development laboratories, and many other positions where radioactive materials and measuring equipment are in use. Our first class will be graduating in 1966 and we expect no difficulty in placing them.

Training Agricultural Technicians at Modesto Junior College

By Walter M. Garcia and
Ernest A. Tarone

President and Agriculture Department
Chairman, respectively,
Modesto Junior College,
Modesto, California

THE total agriculture program at Modesto Junior College rests on a series of basic assumptions about the proper emphasis and character of such vocational and technical programs in a comprehensive junior college. Briefly summarized, these are:

●The program must be designed to serve community agricultural needs. These needs will obviously vary from community to community. Agriculture in Massachusetts will have quite different emphases than agriculture in California.

●The program must be practical in character, and the students must see the relevance of classroom instruction to the kind of activities they will be carrying on in the field of agriculture on completion of the program.

●The program must rely to a high degree on advice and guidance from members of the agricultural community which the college is intending to serve. This argues for the need of intensive and consistent use of advisory committees and individual industry experts in the field, both for the basic programs and specific specialized programs.

●The program, because of its practical emphasis and because it is geared to meet community agricultural needs, must have a faculty actively involved in significant agricultural activities in the area served, and, desirably, with considerable first-hand experience in the conduct of agricultural activities in the area served.

●The program should assist students to appreciate the wide variety of careers and occupations available in agriculture calling for varying levels of training and ability. Useful and productive careers in agriculture can be found for virtually every level of student ability and motivation.

Development of the Programs

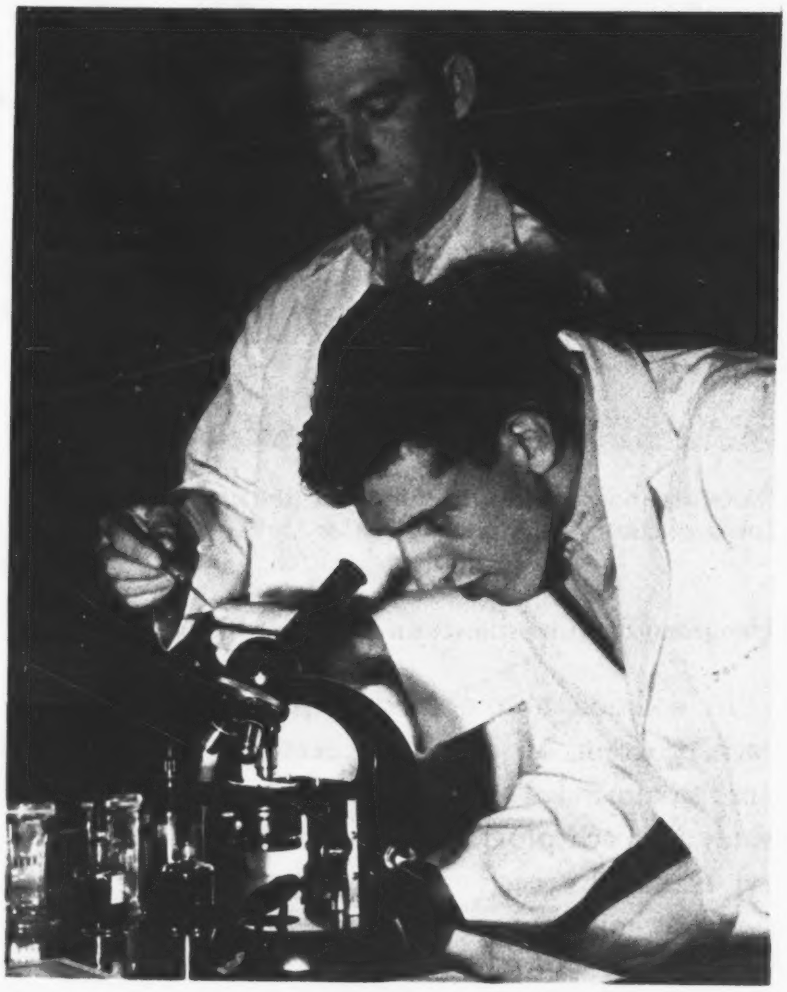
In 1957, a year-long study of off-the-farm related agricultural occupations was conducted by the agriculture department staff of Modesto Junior College. The study pointed to an increasing need for trained workers in agriculture above the simple skilled level. In 1960-61 a study under National Defense Education Act auspices, conducted by Dr. Jerry Halterman of our faculty, resulted in a report called "Technicians in Agriculture." A follow-up to Dr. Halterman's study was made in 1962-63 by Mr. Luverne Donker of the agriculture department. Dr. Halterman's study surveyed the needs of agriculture in central and northern California for trained workers, and Mr.

Donker's study attempted to discover what kinds of skill and training employes in agriculture identified as being necessary for success in their work. Mr. Donker's study resulted in a report entitled, "Agricultural Technicians." These studies pointed up the demand for trained technicians in the field of agriculture and, with the assistance of industry advisory groups, training programs designed to meet the need were and are being instituted at Modesto Junior College. At this writing there are six such programs: agricultural laboratory technician, artificial-insemination technician, park-maintenance technician, landscape-engineering technician, quality-control and inspection technician, and fluid-power technician in the field of power and machinery.

Once the areas of need were established and a priority ranking on the basis of most acute shortage made, industry advisory committees were carefully selected and convened. In each case a series of meetings was held with the advisory committees and the following steps taken:

1. The findings of the study were presented and either verified or modified by the advisory committees.

Skills in design and planning are emphasized as part of the agricultural technician program at Modesto Junior College.



Use of the microscope and slides, involving many techniques, are also studied in agricultural technology.

2. If the findings were substantiated, the committees reviewed the offerings in this field presently available at the college.

3. The committees were then asked to specify the skill and level of training beyond that available in these basic offerings, which they felt an employable technician in their field needed.

4. Following these analyses, the committees helped in structuring the courses and their content so as to give the technical emphasis needed for the program.

5. The industry, as represented by those in attendance, was asked the extent to which they could contribute personnel, equipment, and materials to help in the training.

At every point in the development of the programs, including course development, industry was involved.

As a result of the procedures outlined above, and in accord with the principles enunciated earlier, the six programs were established in the agriculture department in addition to the already well established vocational programs.

Students in artificial insemination get practical training for proficiency in Modesto Junior College's agricultural technology course.

Program Requirements and Curriculums

In addition to the courses specifically related to each program, 16 units of general education courses are recommended as an essential part of the course of study for each program. These courses include physical education (each semester), introduction to college psychology, first aid and hygiene, American government, U. S. history, English and speech.

Agricultural Laboratory Technicians.—Graduates in this field must have knowledge and skill in the use of the instruments and procedures of science and mathematics commonly found in agricultural laboratories in the area; skill in basic arithmetical computations; competency in report writing; and basic knowledge in dairying, agronomy, crop production, horticulture, poultry, soils, and fertilizers. The recommended course of study includes:

Agriculture Courses—30 units

Basic Science and Laboratory Techniques
Record Keeping
Agricultural Experience Program
Agricultural Computations
Agronomy
Truck Crops
Plant Pest Control
Milk Production
Diseases and Parasites of Cattle
Basic Agricultural Science

Recommended Electives—18 units

Bacteriology
Chemistry
Biology
Business Organization
Personal Typewriting

Artificial Insemination Technicians.—Graduates in this field must have demonstrated manipulative skills in using the instruments and supplies of artificial insemination; must have knowledge and skill in the use of instruments and procedures of science and mathematics found in agricultural laboratories in the area; skill in arithmetical computations; competency in report writing, public speaking, and salesmanship; and knowledge in animal breeding, pedigree evaluation, disease and sanitation, feeds and nutrition, and dairy, beef, sheep, and swine production. The recommended course of study includes:

Agriculture Courses—30 units

Agricultural Experience Program
Principles of Dairying
Beef Production
Breeding and Selection
Diseases and Parasites
Dairy or Livestock Management
Advanced Breeding and Artificial Insemination
Laboratory Technology and Basic Science
Record Keeping and Analysis

Recommended Electives—18 units

Bookkeeping
Salesmanship
Psychology
Personnel Management
Introduction to Business
Personal Typing
Agricultural Computations
Milk Production and Equipment
Sheep Production
Swine Production
Agricultural Economics
Agricultural Marketing

Precision weighing is important to the agricultural technician in research, quality control, and diagnosis.

Park Maintenance.—Graduates in this field must have knowledge and skill in ornamental horticulture, the basic plant sciences, horticulture, arboriculture, turf culture, surveying, irrigation, report writing, basic arithmetical computations; and knowledge in soils, fertilizers, power, and machinery. The recommended course of study includes:

Agriculture Courses—30 units

Ornamental Plant Identification and Materials
Home Nursery Practices
Special Problems—Ornamental Horticulture
Turf Grass Production and Management
Basic Agricultural Mechanics
Agricultural Computations
Soils
Park and Nursery Maintenance
Landscape Engineering

Recommended Electives—18 units

Personnel Management
Bookkeeping
Personal Typing
Irrigation and Drainage
Plant Pest Control
Fertilizers
Farm Tractors
Farm Power

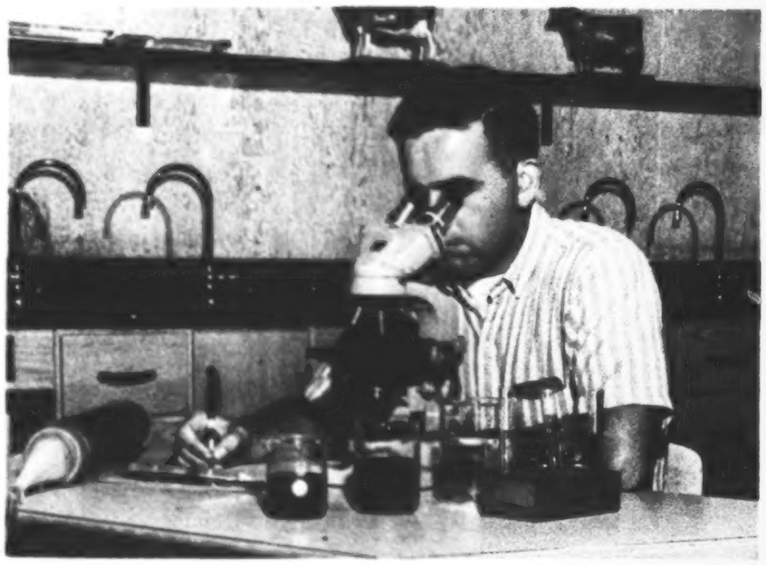
Landscape Engineering.—Graduates in this field must have knowledge and skill in ornamental horticulture, turf culture, surveying, irrigation, principles of sketching in landscaping, estimating and contracting, as well as knowledge in soils and drainage. The recommended course of study includes:

Agriculture Course—30 units

Ornamental Plant Identification and Materials
Home Nursery Practice
Special Problems—Ornamental Horticulture
Turf Grass Production and Management
Basic Agriculture Mechanics
Agricultural Computations
Soils
Landscape Planning and Design
Park and Nursery Maintenance
Landscape Engineering

Recommended Electives—18 units

Basic Drawing (Art)
Farm Electrification
Plant Pest Control
Irrigation and Drainage
Farm Power
Personnel Management
Bookkeeping



The agricultural technician requires skill and knowledge in the use of modern laboratory equipment and techniques.

Quality Control and Inspection.—Graduates in this field must have knowledge and skill in the use of the instruments and procedures of science and mathematics found in agricultural laboratories in the area; skill in basic arithmetical computations; competency in report writing; knowledge in agronomy, fruit production, and the general plant sciences; and knowledge of regulations (federal, state, and local) applicable to food and its processing. The recommended course of study includes:

Agricultural Courses—30 units

Agronomy
Plant Pest Control
Truck Crops
Field Crops
Agricultural Computations
Laboratory Techniques
Quality Control Procedures

Recommended Electives—18 units

Personal Typing
Ornamental Plant Identification
Elementary Horticulture
Orchard Management
Agricultural Marketing

Fluid Power.—Graduates in this field must have knowledge and skill in hydraulics and pneumatics as applied in agricultural machinery and structuring; skill in basic arithmetical computations; competency in report writing; and knowledge in farm power and power transmission, farm machinery, farm electrification, surveying, irrigation and drainage, as well as a fundamental understanding of the cultural practices used in the basic crops of the community. The recommended course of study includes:

Agricultural Courses—30 units

Farm Tractors
Farm Power
Farm Machinery
Farm Electrification
Basic Agricultural Mechanics
Welding
Agricultural Fluid Power
Agricultural Computations
Agronomy
Animal Production
Soils

Recommended Electives—18 units

Freehand Sketching
Human Relations
Elementary Geometry
Elementary Algebra
Free Choice

Facilities and Equipment

Facilities and equipment for these programs have been provided for the most part under the National Defense Education Act and the Vocational Education Act. Equipment in each of these areas is quite extensive, and for each area a complete list would be excessively lengthy. Major equipment needed in each area, however, may be typified by the following:

Agricultural Laboratory Technicians

1. Abbe Refractometer
2. Compound Microscope
3. Stereoscopic Microscope
4. Coleman Flame Photometer and Spectrophotometer
5. Barnstead Autoclave
6. Beckman Chainomatic, Magnetically Dampered Analytical Balance
7. Kjeldahl Digestion and Distillation Apparatus
8. Sohxlet Fat Extraction Apparatus

Artificial Insemination Technicians

1. Ampule Sealer—for sealing glass ampules
2. Liquid Nitrogen Freezers—for storing frozen semen
3. Electro Ejaculation Kit and Artificial Vagina—for collecting semen
4. Insemination Kit—for insemination of animals
5. High Powered Microscope—for sperm evaluation
6. Autoclave or Sterilizer—for sterilizing equipment

Park Maintenance

1. Hiboy-Hydraulic Control Bucket for Tree Trimmers
2. Power Chain Saw
3. Power Sprayers
4. Verticut—Turf
5. Airifier—Turf and Tree
6. Top Dresser
7. Fertilizer Spreaders

Landscape Engineering

1. Time Clocks
2. Solenoid Valves
3. Concrete and Mortar Mixers, Trowels, etc.
4. Pitot-Pressure Gage
5. Plumbing Equipment
6. Painting Equipment
7. Power Augers
8. Power Woodworking Equipment

Quality Control and Inspection

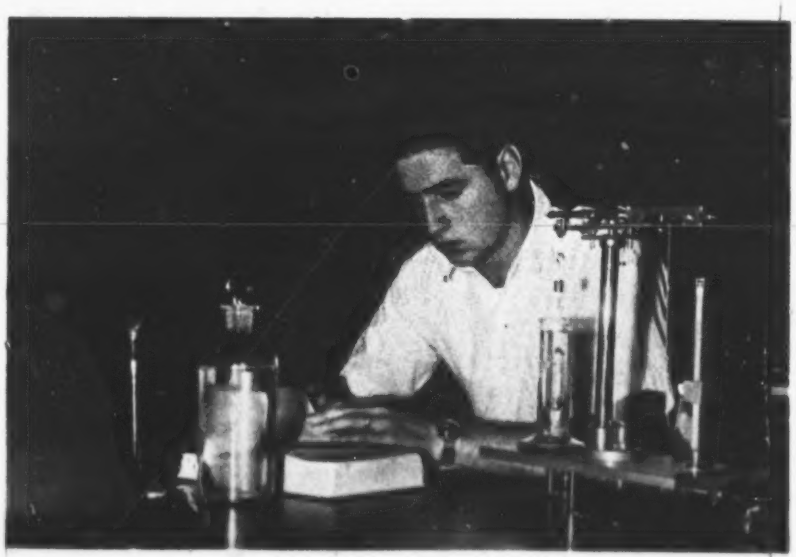
1. Refractometer
2. Colorimeter
3. Balance Scales—over/under by ¼ oz.
4. Acid Drying Tower
5. Microscopes
6. Howard Mold Count Chamber
7. Titration Equipment
8. Ph Meters
9. Gram Balances
10. Colony Counter

Fluid Power

1. Hydraulic Demonstration Unit—(use of boosters, intensifiers, valves, accumulators, pump, motors, cylinders)
2. Pneumatic Demonstration Unit
3. Hydraulic Test Stand—(pressure gages, flow gages)
4. Pneumatic Test Stand

Basic classroom facilities for these programs are provided in the existing agriculture department facility, to which is currently being added two additional laboratories constructed in part from Vocational Education Act funds. There are ten laboratories and classrooms used for instruction in these programs. Exten-

Modesto Junior College's agricultural technician-training program encompasses knowledge of science and math, including the accurate use of scientific instruments.



sive use is made of facilities in cooperating industries and firms, primarily for demonstration and laboratory purposes.

Successful Placement of Graduates

Since these specific programs are relatively new, experience in placement of graduates is limited as yet. It may be interesting to report, however, that all graduates of these programs have been virtually assured of placement, with entry salaries ranging from $4,000-$6,000 per year, leading to salaries in four to five years of $15,000 in such fields as artificial insemination technician. Members of the advisory committees, in particular, have demonstrated a keen interest in employing graduates of these programs, or in assisting them to find appropriate employment, and we are assured that graduates with the requisite skills can very quickly move into major supervisory jobs, so critical is the need for trained workers in these fields. Of particular significance is the requirement of employers that graduates of these programs who are oriented toward supervisory jobs should have superior communication skills and abilities in human relations.

Some Conclusions

As a result of conducting the studies and of meeting with advisory committees, a whole new vista of training program possibilities has been opened up for the agriculture department at Modesto Junior College. Once an institution commits itself philosophically to the kind of program described above and based on the premises listed, new needs will continually emerge. We see the necessity, for instance, to establish two-year programs in natural resource management and for the training of sales-service technicians. Our experience convinces us that the need for additional programs will become obvious as a result of the basic philosophical commitment of the institution.

The Erie County Technical Institute Program in Dental Hygiene

By Albert E. Roberts, D. D. S.

Head, Dental-Hygiene Department,
Erie County Technical Institute,
Buffalo, New York

A BRIEF look at some figures in the field of dentistry serves to point out the necessity for qualified dental hygienists in this country and, hence, the necessity for good training programs and the recruitment of young women into the field. At present there are approximately 100,000 dentists in the United States and approximately 8,000 to 10,000 dental hygienists. At least one authority in public health states that every dentist should have a hygienist working with him and that an acceptable minimum should be at least one dental hygienist for every two dentists.

The demand is not restricted to private practice; it exists in hospital and industrial clinics, in public-health work, in public schools, and for dental-hygiene teachers. In a field restricted primarily to women, there is not only a great demand for more women in the field, but excellent salary and advancement possibilities as well.

One institution taking steps to meet this need is the Erie County Technical Institute, Buffalo, New York, where a dental-hygiene program is geared to train young women desiring professional employment as licensed dental hygienists under the supervision of a licensed dentist. Graduates are awarded the degree of Associate in Applied Science and are qualified to enter the professional field as dental hygienists in hospital clinics, private dental offices, institutional clinics, industrial clinics, government health service, and as dental-hygiene teachers and school dental hygientists.

The Institute program offers a study of the basic sciences, emphasizing the teeth and their supporting structures. The importance of instruction through lectures, recitations, laboratory, and clinic work is recognized in the study of the theory and technics of preventive dentistry and dental prophylaxis. Manual dexterity is developed through tooth carving and practice with dental instruments on manikins. When proficient, the students advance to work on fellow students and clinic patients.

Significant, too, is the opportunity given during the second year to gain practical experience in dental-hygiene techniques. The students devote either the fourth or the fifth quarter of study in out-clinic work with the cooperation of local hospitals, the dental clinic of the State University of New York at Buffalo, and public and parochial schools of Buffalo and Erie counties.

Recognizing the need for, and importance of, speaking and writing skills, the Institute also requires that general education courses and communication skills be included in each student's curriculum.

Physical Facilities

Important to the success of any training program in dental hygiene are the facilities available to instructors and students. The following facilities, available in the dental clinic at Erie County Institute, are suggestive of what should be included in any dental clinic where training in dental hygiene is offered:

Ample floor space for 32 dental units and chairs and one X-ray unit (General Electric).

Both natural and artificial lighting.

Supply room and sterilization room opening into clinic. Sterilization room equipped with stainless-steel counters and cabinets for clinical supplies. A shelved window opening directly into clinic for the distribution of supplies.

Waiting room with desk and 55 chairs adjoining the clinic.

Ritter X-ray machine in one classroom. Modern darkroom for processing X-rays adjoining classroom.

Large laboratory equipped with benches and tables to which manikins are attached for use in the teaching of instrumentation. The laboratory is also used for bacteriology and dental anatomy laboratory instruction in the pouring of models and the carving of teeth. In addition many visual aids in the form of models and projectors are in use in the laboratory.

Curriculum

During the first quarter of training, the student takes a total of 23 credit hours composed of the following courses:

Course	*Credit Hours*
Dental Anatomy	3
Clinic Practice	2
Preventive Dentistry	3
Histology	2
Gross Anatomy and Physiology	3
Dental Health Education	3
Communication Skills	4
Chemistry	3
	23

This course of study is designed to introduce the student to a basic knowledge of the structure and function of the teeth, supporting structure, blood and nerve supply, muscles of mastication, mandibular movement, and occlusion. The student also begins to develop manual dexterity in the use of instruments at this time. The use and care of equipment, clinic procedures consisting of dental prophylaxis, inspections, sterilization, armamentarium, reception of patients, supervision, and clinic records are covered. The student is introduced to the basic terminology of general histology in order to better comprehend oral histology and to become acquainted with the histological composition of the oral cavity. This first quarter of study also serves to begin preparation for the teaching and instruction of school children in sound dental-health practices.

The second on-campus quarter consists of 21 credit hours composed of the following courses:

Course	*Credit Hours*
Dental Anatomy	3
Clinic Practice	2
Preventive Dentistry	2
Histology	2
Gross Anatomy and Physiology	3
Bacteriology	2
Communication Skills	4
Chemistry	3
	21

Building on the first-quarter sequence of studies, the courses included during this quarter are designed to further the student's knowledge of the histological composition of the oral cavity, to introduce the student to composite pictures of several microscopic slides and medichromes in order to familiarize her more adequately with the histological composition of various oral tissues, and to provide an elementary knowledge of the embryonic development of the face and oral cavity. During this period of training, the

Students in dental hygiene at Erie County Technical Institute, Buffalo, New York, gain practical experience.

The sterilization room at Erie County Technical Institute is equipped with stainless-steel counters and cabinets.

student also is instructed in stains and deposits on the teeth, the factors which influence the accumulation of such stains and deposits, further information about children's teeth, and the role of the hygienist as a patient educator in the private office.

The third on-campus quarter includes the following courses:

Course	*Credit Hours*
Dental Anatomy	2
Clinic Practice	1
Preventive Dentistry	2
Methods in Dental Health Education	3
Bacteriology	2
Hygiene and First Aid	3
Communication Skills	4
Social Science	3
	20

At this point, students are expected to build on their knowledge of dental anatomy and gain a basic concept of the structure and function of the teeth, supporting structure, blood and nerve supply, muscles of mastication, mandibular movement, and occlusion. During this time, they are also trained to recognize various mouth conditions including those associated with pregnancy, common mouth diseases, and clinical observations of pathological conditions or anatomical defects in order to correct them before they become serious. The methods and materials of dental hygiene are also introduced to aid the student in the proper selection of those materials and methods used to teach denal health. The technique of classroom lecturing is pointed out by student demonstration and the student is assisted in giving instruction to various age and grade levels as well as learning to present factual, visual, and auditory aids. Time is also devoted to the program of the dental-hygiene teacher, her responsibilities and ability to obtain cooperation from classroom teachers and health personnel. At this time also, the student begins preparing for provisional dental-hygiene certification which will enable her to be employed in a school health program.

The fourth or fifth quarter is devoted to out-clinic experience. During the on-campus quarter the student receives advanced instruction in:

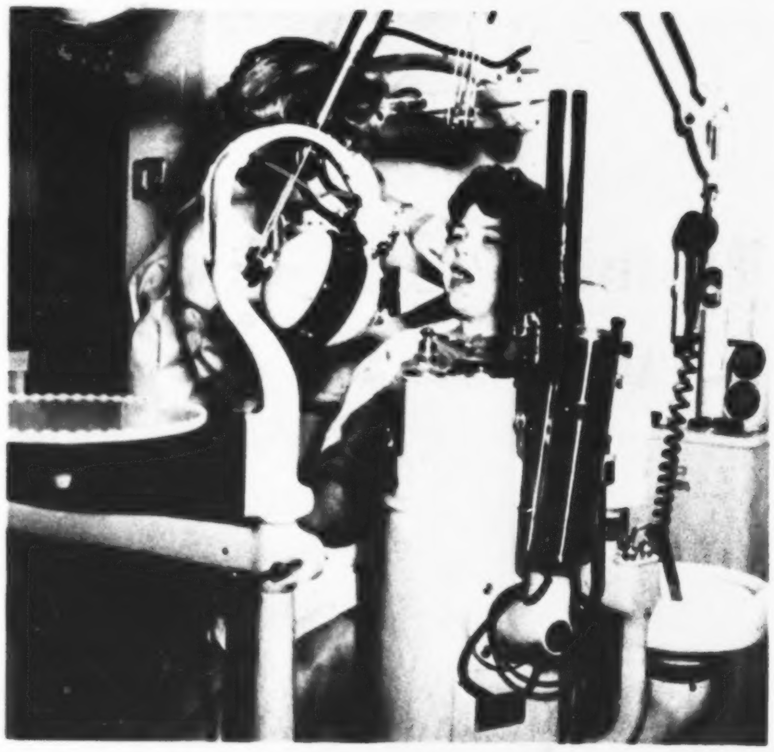
Course	*Credit Hours*
Clinic Practice	2
Pathology	2
Pharmacology	2
Nutrition	3
Radiology	3
Office Practice	3
Health Service in Schools	3
School Organization	3
	21

During this period of study, more time is devoted to the numerous aspects of the school health program, its functions, practices, and personnel. The student studies the place of health service in public education, gains further insight into coordinating her services with parents, teachers, and other health personnel serving the school health program, and is further prepared for provisional dental-hygiene certification.

The causes and classification of disease, the changes produced by disease, and the importance of this knowledge to dental-hygienist training is stressed as the student learns about the diseases affecting the dental structures and the other tissues of the oral cavity. At this point she also learns the importance of early recognition of such conditions and the role of the hygienist in prevention of diseases affecting the oral cavity.

Chemistry courses which were required in the first two quarters become significant as a prerequisite to the course in pharmacology required in the last two quarters of on-campus study. The principles of general pharmacology are taught and stress is placed on dental pharmacology and the drugs used in the prac-

The dental hygiene curriculum at Erie County Technical school includes clinic practice as well as instruction in the classroom and laboratory work.



Dental hygiene students devote either the fourth or fifth quarter of their study to out-clinic experience in local hospitals and schools.

tice of dental hygiene, including drug legislation. A course in radiology serves to acquaint the student with the history of X-ray, X-ray machine, Coolidge tube, developing, mounting, and detecting normal and abnormal conditions in the mouth.

The course in school organization is specifically geared to prepare each student for temporary certification as a dental-hygiene teacher in the state of New York. During this course, the student becomes familiar with school organization, including state laws governing the establishment of public schools, administration, personnel, and school operation. The functions and policies of the dental-hygiene programs in schools as defined by the State Education Department and the New York State Dental Society are also included. Finally the student is acquainted with the present school-dental-hygiene program and the opportunities for placement in schools in the state.

During the last quarter of study, the student takes courses in:

Course	*Credit Hours*
Psychology	3
Anatomy and Physiology	2
Preventive Dentistry	1
Clinic Practice	2
Pathology	3
Pharmacology	2
Radiology	3
Office Practice	3
	19

This final period of instruction prepares the student to handle business records and forms in a way which is readily adaptable to the various systems in dental offices. A review of preventive dentistry, with a direct relation to the operation of oral prophylaxis, is presented, thus completing the student's preparation for the practice of her profession.

Training Fluid-Power Technicians at Milwaukee School of Engineering

By Russell W. Henke

**Director, Fluid Power Institute,
Milwaukee School of Engineering,
Milwaukee, Wisconsin**

SINCE World War II, a decided change has been evident in the fluid-power field. While fluid power is based on rather well-established principles of fluid mechanics, it has been treated historically as a facet of some area of industrial activity. This has resulted in the development of so-called industrial hydraulics, mobile equipment hydraulics, industrial pneumatics, and similar terms. Each of these areas has left its mark on the approach to the problems encountered and the equipment engineered to solve these problems. Until comparatively recently, the result has been a rather heterogeneous array of fluid-power components reflecting these various problem-solving philosophies.

Gradually a more sophisticated analytical approach to the technology has evolved. Instead of the older "static equilibrium" sort of analysis previously applied to fluid-power systems, the new dynamic or "systems" approach has been adopted. From this metamorphosis, fluid power has come to be defined as: "The technology of the transfer, control, and storage of power by means of a pressurized fluid."

Surveys of industry and contacts with government agencies have established the need for additional personnel trained in fluid-power technology. The current rate of growth of the industry is short of its potential because of insufficient numbers of adequately trained personnel. Traditionally, an area of technology can grow only if it has a continuing supply of competent, well educated individuals to support it. Industry can go only so far in developing a technology. Sooner or later, a partnership must be formed with education so that the supply of trained people is adequate to meet the demands of continued growth.

In the case of fluid power, the educational community has not responded to this need with sufficient alacrity. Two surveys, made in 1957 and 1962 by the National Fluid Power Association, have demonstrated that there are fewer than three dozen colleges in the country offering fluid-power courses. For the most part, these consist of a one-semester elective in a baccalaureate degree program. The 1962 survey also indicated that more than 65 percent of the companies replying needed more personnel trained in fluid-power technology.

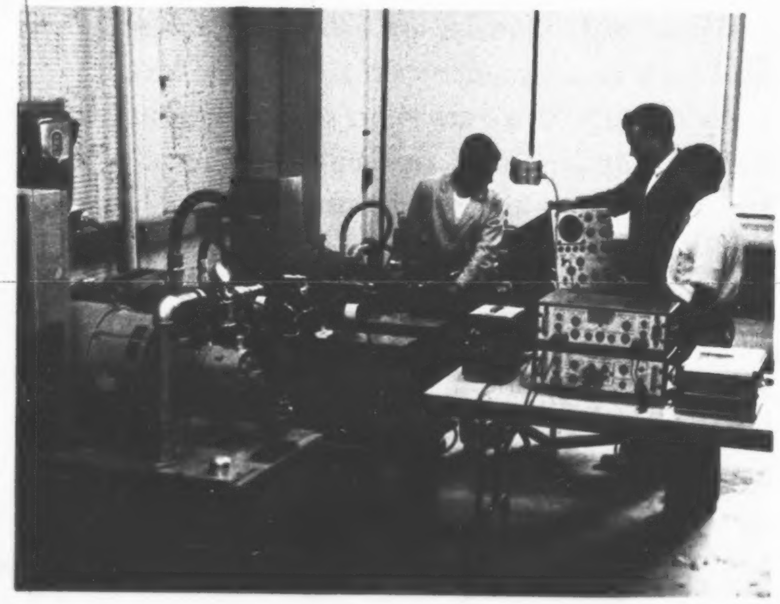
Development of the MSOE Program

Because of its close association with industries either engaged in or utilizing fluid power, the Milwaukee School of Engineering recognized the need for, and the potential of, fluid-power education. The first MSOE program in this area was a series of two subjects in industrial hydraulics offered in the Evening Division. It soon became evident that this was not adequate to cover the subject matter nor to accommodate the broad spectrum of student capabilities encountered. The Evening-Division program was expanded to a six-subject series: introduction to fluid power, fluid-power maintenance, basic hydraulics, mathematics of fluid power, advanced hydraulics, and advanced circuits. Continued interest on the part of industry indicates that a seventh subject, analytical techniques in fluid power, may be added to the hydraulics series, and that an introduction to industrial pneumatics may also be in order.

With the experience gained from the development and implementation of the Evening-Division series, plans were made for a program in fluid-power technology in the Day Division. It was determined that the appropriate place to initiate such a curriculum was within the two-year engineering-technology structure. In October 1962, MSOE announced the first program in the country leading to the degree of Associate in Applied Science in fluid-power engineering technology.

The Curriculum

The first three quarters of study are common with the other eight engineering-technology curriculums offered by MSOE. The curriculums require three quarters of calculus, two quarters of chemistry, three quarters of physics, three quarters of engineering fundamentals and measurements, two quarters of materials and processing, three quarters of engineering graphics, three quarters of English, and one quarter each of psychology, law, speech, and social science. They are arranged as follows:



A view of the fluid-power laboratory at Milwaukee School of Engineering, showing typical equipment.

FRESHMAN YEAR QUARTER	1	2	3
Engineering			
Engineering Fundamentals I	3-4-4		
Engineering Fundamentals II		5-3-6	
Materials			3-0-3
Materials Processing			2-6-4
Science			
College Algebra	5-0-4		
General Chemistry I	3-3-4		
Analytic Geometry and Calculus I		5-0-5	
General Chemistry II		3-3-4	
Analytic Geometry and Calculus II			5-0-5
Physics of Mechanics			3-3-4
General Studies			
English I	3-0-3		
Engineering Graphics I	1-4-3		
Freshman Lecture I	1-0-0		
General Psychology		3-0-3	
Engineering Graphics II		0-3-1	
Freshman Lecture II		1-0-0	
English II			3-0-3
Engineering Graphics III			0-3-1
	16-11-18	17-9-19	16-12-20

SOPHOMORE YEAR QUARTER	4	5	6
Engineering			
D-C and A-C Machines I	3-3-4		
Fluid Mechanics	3-0-3		
Introduction to Fluid Power	3-0-3		
Circuit Analysis		3-0-3	
Fluid-Power Laboratory I		0-3-1	
Fluid-Power Maintenance		2-4-3	
Industrial Pneumatics		3-0-3	
Introduction to Hydraulic Circuits		3-0-3	
Fluid-Power Laboratory II			0-3-1
Hydraulic Components			3-0-3
Analytical Techniques in Fluid Power			2-4-3
Advanced Hydraulic Circuits and Systems			3-0-3
Problems in Fluid Power			3-0-3
Science			
Calculus III	4-0-4		
Physics of Electricity and Magnetism	4-3-5		
Physics of Heat and Wave Motion		4-3-5	
General Studies			
Social Science	3-0-3		
English III		3-0-3	
Speech			2-3-3
Law			3-0-3
	20-6-22	18-10-21	16-10-19

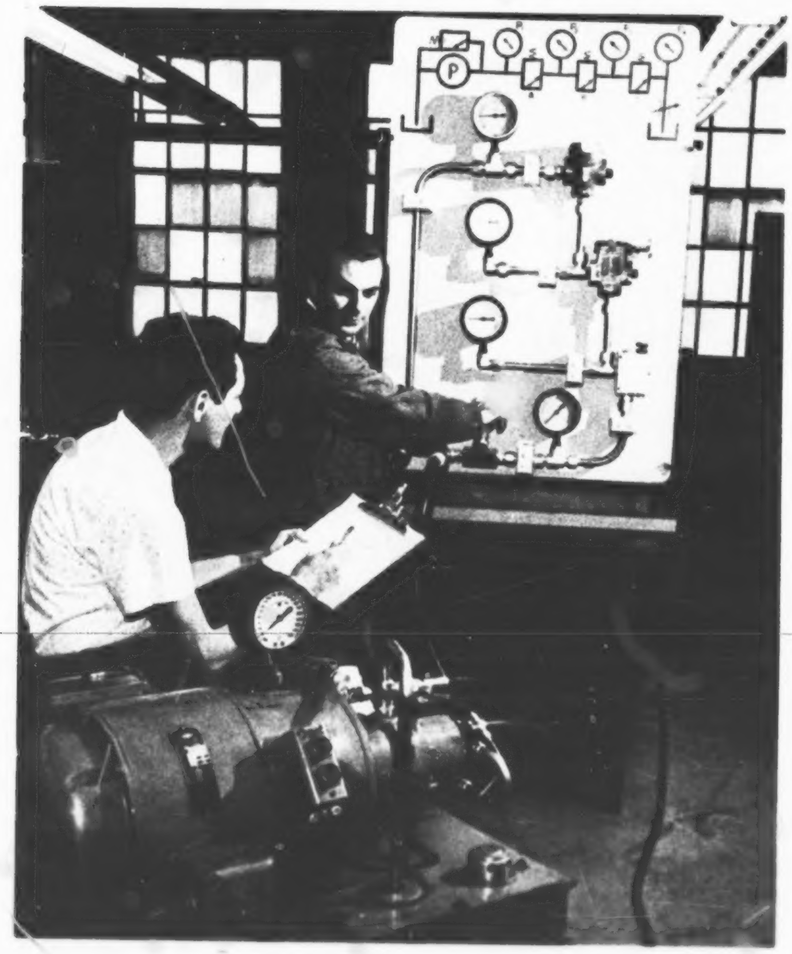
NOTE: Numbers in quarter columns indicate lecture hours per week, laboratory hours per week, credit in quarter hours, in that order.

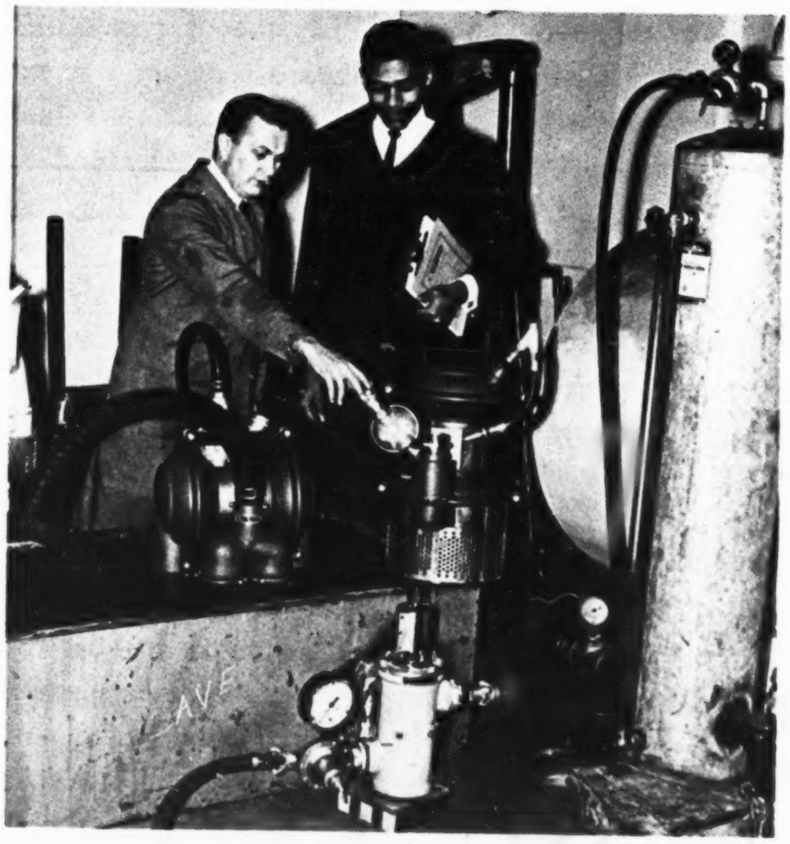
The technical-specialty subjects, which begin in the fourth quarter of the fluid-power engineeering technology, are:

Course	*Hours/Quarter*	*Credit in Quarter Hours*
Fluid-Power Laboratory I	36	1
Fluid-Power Laboratory II	36	1
Fluid Mechanics	36	3
Introduction to Fluid Power	36	3
Fluid-Power Maintenance	72	3
Industrial Pneumatics	36	3
Introduction to Hydraulic Circuits	36	3
Hydraulic Components	36	3
Analytical Techniques in Fluid Power	72	3
Advanced Hydraulic Circuits and Systems	36	3
Problems in Fluid Power	36	3

These technical-specialty subjects represent 468 contact hours or 29 quarter hours of credit in fluid-power technology. Content includes material of a fundamental nature, applications of information, methods of analysis, and measuring techniques. Opportunity is provided for student research projects or work in the research laboratory.

A fluid-power demonstration board aids in clarifying important points made in the lectures.





An instructor explains an air-driven water pump test to a fluid-power technician student.

Faculty

One difficulty in initiating a fluid-power program is likely to come in the area of faculty development. At the present time, there are very few individuals with the desired engineering and practical background in fluid power who are willing to move from industry into education. With the current demand in industry for qualified people, educational institutions are at a competitive disadvantage.

Currently, there are no fluid-power education programs at any of the colleges offering teacher-training. A move is underway to develop a pilot program in this area. However, this program will be basically in the vocational-industrial arts field. Few attempts have been made to do anything on a collegiate level.

Periodically, there are short conferences in hydraulics or controls related to fluid power. One of these is a two-week course in industrial hydraulics sponsored by the National Conference on Industrial Hydraulics. Another is held at the Massachusetts Institute of Technology. These are aimed at engineers in industry and, while they might furnish background for teachers, are not education-oriented. In addition, MSOE sponsors a series of one-day seminars on fluid-power topics. Generally, one is scheduled in September, another in February, and a third in late May or early June. This fluid-power seminar program is moving into its fourth year. Here again, however, the orientation is toward engineers in industry. Should sufficient demand be evidenced, it is probable that MSOE will develop a program in fluid power for teacher training.

Laboratory Development

Ultimately, the key to a successful program in fluid-power education depends on the development of suitable laboratory facilities. The educational and research functions must be separated as much as possible.

At the Milwaukee School of Engineering, fluid-power laboratory space allotment includes approximately 1,600 square feet for educational purposes, about 350 square feet for shop area supplementary to the laboratory, 1,500 square feet for applied industrial research, and about 400 square feet for expansion of research activities. These facilities are under the administration of the Fluid Power Institute, which is a separate department within the MSOE administrative structure.

Laboratory development revolves around acquisition and installation of typical fluid-power components and related equipment. For the school desiring to go into the fluid-power technology field in a modest way, there are several training devices currently on the market. These devices, with coordinated source materials, will enable a school to develop a basic course in the technology. If an entire fluid-power technology program is anticipated, laboratory facilities will have to be quite extensive.

Small-size commercial components in the 10-hp range make a good choice as a basis for a fluid-power laboratory. A wide variety of materials is available and related electrical equipment and power requirements are of a practical size. However, it is important that the availability of electrical power be resolved early.

In the past, realizing that lack of education affected their futures, many companies have been cooperative in donating equipment to schools developing fluid-power laboratories. However, as the demand for such support increases, it becomes more likely that schools, especially tax-supported schools, may be expected to pay their own way. This is true to a great extent today in the field of instrumentation.

At MSOE, a minimum of permanent test and demonstration stands have been set up in the educational laboratory. As much equipment as possible is breadboarded and the power units are mounted on casters for greater mobility. This gives maximum flexibility and requires minimum floor space. Fluid-power setups are, by their nature, relatively large. Permanent installations necessitate large space allocations.

A basic laboratory could be set up for an estimated $5,000 investment in fluid-power equipment and, perhaps, a matching $5,000 for instrumentation. For advanced areas, such as servosystems, the investment will be greater. Any anticipated research activity will add further to the costs.

Students work on hydraulic pumps in the fluid-power laboratory session.

A discussion and explanation of cylinders is accompanied by demonstration.

3

Graduate Objectives

Because of the tremendous breadth of fluid-power technology in our modern industrial and defense communities, the choice of positions for graduates covers an unusually wide field. The MSOE Fluid-Power Engineering Technology program provides preparation for engineering-technician occupations such as:

Design Technician.—Sketches designs and prepares drawings for the development of fluid-power components and systems.

Development Technician.—Assists engineers in developing experimental fluid-power components and systems.

Field-Service Technician.—Installs and maintains fluid-power systems and is manufacturer's representative.

Fluid-Power Technician.—Inspects, operates, and services fluid-power equipment in actual industrial applications.

Laboratory Technician.—Plans, sets up, and conducts fluid-power laboratory research and evaluation tests.

Production Supervisor.—Coordinates employes and processes in the manufacture of fluid-power components and equipment.

These occupations represent only a few of the many areas in design, research, testing, field service, sales, plant maintenance, and processing for which fluid-power technology graduates are qualified.

This article is adapted from a talk given by Russell Henke at the annual meeting of the American Society for Engineering Education, June 17-21, 1963, in Philadelphia, Pennsylvania.

Setting Up an Optical Technology Program

By Robert E. Bergstrom

**Former Director, Eveleth Area Vocational Technical School,
Now Assistant Director, Vocational and Adult Education,
Duluth Area Vocational-Technical School,
Duluth, Minnesota**

TRAINED technical workers in the optical field are in great demand and there is even greater potential for growth. Eighty million people wear glasses. Thirteen million eyeglass wearers need new prescriptions and new glasses. In addition, there are more than 23 million who ought to be wearing glasses. Based on these and other considerations, the Better Vision Institute says that the immediate total potential for the industry is 70 million more pairs of glasses above and beyond the present volume.

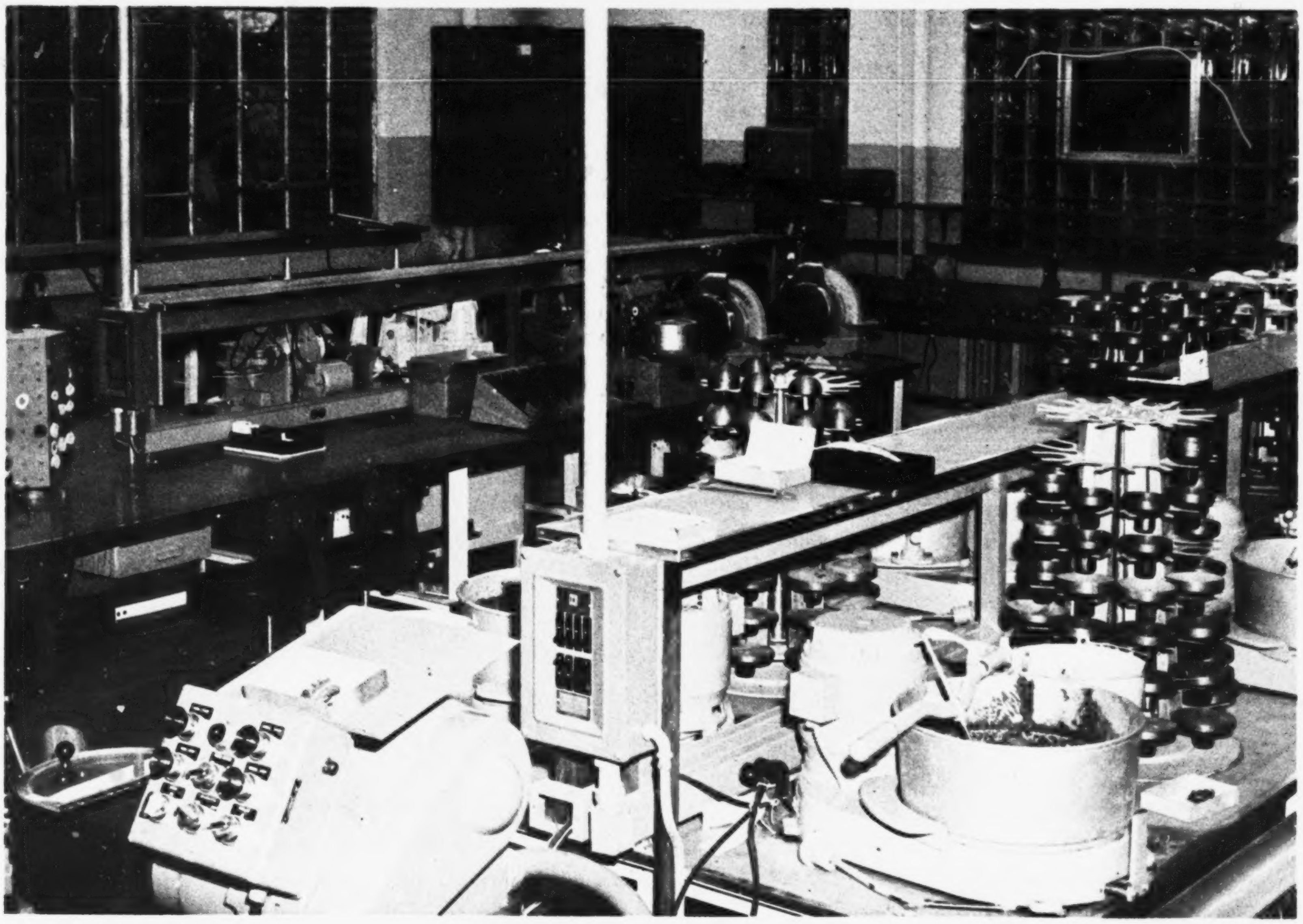
This growth has created a demand for ophthalmic optical technicians to grind and finish eyeglass lenses and dispense the spectacle frames and lenses to those who wear glasses. Such a technician prepares lenses according to the prescription or specifications of an ophthalmologist or optometrist. A fully-trained technician may be required to perform both laboratory and dispensing operations. In actual practice, however, technicians usually specialize in one of the two fields.

The demand for trained technical workers in both fields of the optical industry has, in turn, created a demand for the establishment of optical-technician training programs. This demand can and is being met through the cooperation of the industry and the school.

Development of the Program

This shortage of qualified help, the scarcity of schools where training may be had, and the opportunities which lie ahead for the optical industry have resulted in a giant step forward in the development of what might be termed "cooperative vocational education" in Minnesota. The faith that industry has in well conceived vocational education programs is evidenced by the Optical Technical Program at Eveleth. This cooperative program has resulted in training on occupationally oriented equipment, a laboratory which reflects the latest developments in the industry, instruction presented by highly experienced instructors from industry, placement for graduates, and continuing help and guidance by the cooperating firm, The House of Vision, Inc., Chicago, and its management team.

This educational opportunity offered to the young people of Minnesota was the direct result of industry and school cooperation. The initial contact was made at a meeting of The House of Vision, Inc., and an industrial development group from Eveleth, Minnesota. At this meeting, representatives of the firm discovered the existence of the Area Vocational-Technical School in Eveleth. A discussion of the shortage of well-



A view of part of the optical technology laboratory at Eveleth Area Vocational Technical School.

trained people for this industry resulted in a meeting between representatives of the House of Vision and the administration of the Area Vocational-Technical School to discuss the training of young people for the optical industry.

At this meeting, the necessary factors for establishing such a training program were discussed and resolved in the following manner:

Size of laboratory.—The laboratory contains 1,500 square feet with the layout made at the home office of the cooperating firm. The physical area, utilities, and so forth are supplied by the school. A representative of the firm was sent to Eveleth to install the necessary equipment.

Procurement of experienced instructional personnel.—The cooperating firm agreed to find competent instructional personnel to meet the vocational certification requirement of Minnesota. Instructional personnel is leased from the House of Vision. During the summer they participate in the industry, thereby keeping abreast of new developments and giving them a continuous insight which results in more meaningful formalized instruction.

Cost of setting up a laboratory.—The value of the finished laboratory is approximately $50,000. The actual cost to the school is about $35,000, which will be amortized over a five-year period on a lease-purchase agreement with the cooperating firm. Many instructional materials and aids such as lenses, eyeglass frames, manuals, charts, etc. are donated by the optical industry.

Type of program.—At present, there are only four programs in the United States which offer post-secondary optical-technician training. These programs are located in California, Michigan, New York, and Minnesota. The program at Eveleth runs for nine and a half months, with six hours a day of instruction devoted primarily to developing and training laboratory technicians. Later expansion will be into the area of dispensing opticianry. A tentative plan for expansion

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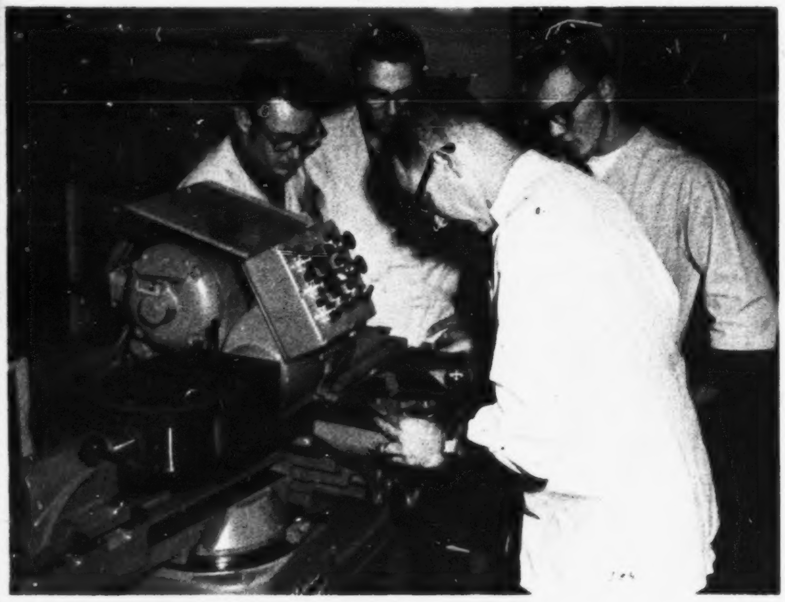


An instructor demonstrates the use of a generator in the optical technology course.

to a two-year program is to retain the present course as a prerequisite and devote the second year of study to contact-lens training, dispensing opticianry, business management, sales, and the like.

Admission Procedures

A good general high-school background is considered adequate for admission to the program as it now stands. The student must be a high-school graduate and have maintained a *C* average in high school. A strong preparation in mathematics, including at least one course in algebra, or mathematical ability, as well as a strong preparation in science subjects is especially important. Good manual dexterity is essential, and a familiarity with shop equipment and tools is desirable. The prospective student must also take the Minnesota Employment Service, G.A.T.B. Test and the Army General Classification Test (civilian version). The high-school transcript and results of tests taken in high school must also be submitted for evaluation before admission to the program.

Course Description and Content

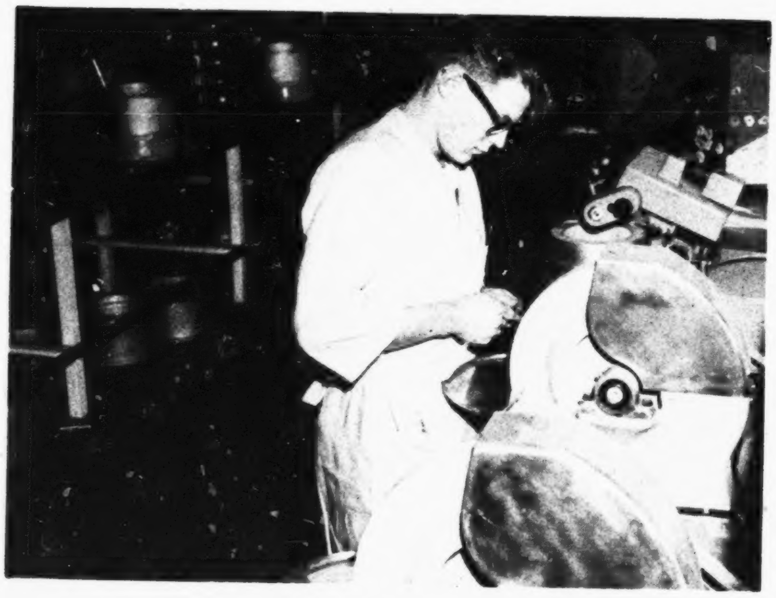
The course is constructed and evaluated with the cooperation of an advisory committee consisting of a member of the optical industry, an optometrist, an ophthalmologist, and a businessman. In this way, the course is kept significant and up-to-date. During the course, students obtain ophthalmic theory and manual technical practice to perform efficiently the operations in making quality prescription eyeglasses. Laboratory operations include layout, grinding, polishing, and edging of various types of lenses ultimately inserted in many types of ophthalmic frames.

The course is geared to a six-hour day; two hours are devoted to lecture and discussion and four are spent in laboratory work. The training is given in completely rehabilitated classrooms and laboratories on modern, up-to-date equipment comparable to that used in the occupation. Following is a breakdown of the coursework and the equipment involved:

Classroom Topics

Orientation to the field of opticianry
Types of lenses, lens surfaces, multifocals
The Rx form, transposition
Surfacing layout and thickness problem
Practice in the use of surfacing charts, algebraic computations, Vertex Power Computer
Finishing layout problems, frame, and lens measurements
Special lens surfacing problems, thickness and curve figuring for cataract lenses, bicentric grinding, myo-disc bifocal grinding, etc.
Inspection routines and standards
Methods of using measuring and marking devices
Problems in plastic lens surfacing, curve figuring, and thickness problems
Instruction in mass-production techniques
Safety precautions, instruction in maintenance
Effective stock systems
Basic anatomy of the human eye
Basic physical and geometric optics
Basic physiological optics
Theory and application of ophthalmic lenses
Basic dispensing theory, fitting, and adjusting
How to seek and apply for employment

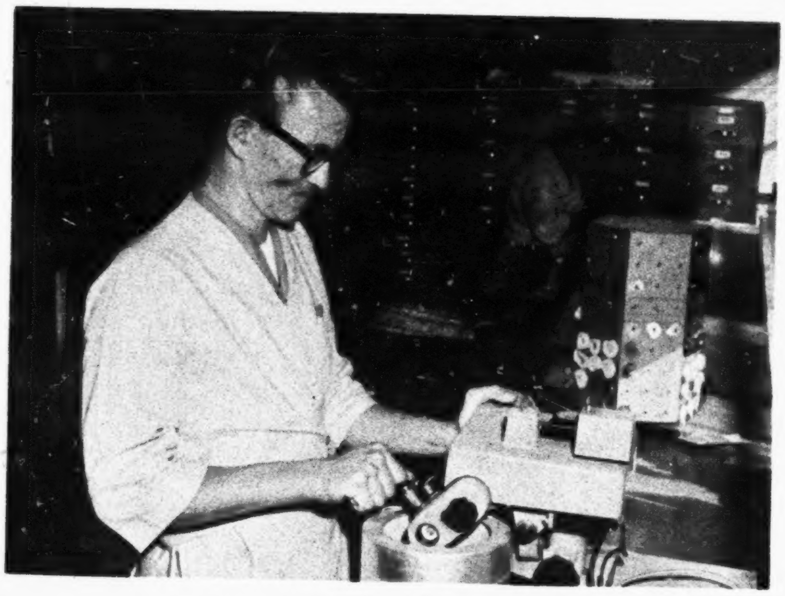
A trainee gets experience in the lens-cutting operation at the Eveleth School.



The hand edging operation.

Laboratory Practice and Projects	*Hours*
Surfacing and finishing layout	115
Hand sphere, cylinder and prism grinding	60
Generator sphere, cylinder and prism grinding	45
Automatic sphere, cylinder, fining, and polishing	25
Special lens surface grinding, polishing, and edging	55
Inspection routines and standards	45
Lens cutting, cribbing, and edging	115
Lens insertion, mounting	115
Measuring and marking devices	60
Soldering, trim work, frame repair, and hardening of lenses	15
Machine maintenance, truing of tools	20
Plastic lens processing	25
Basic dispensing procedure, fitting, and adjusting	25

The lens blocking operation.



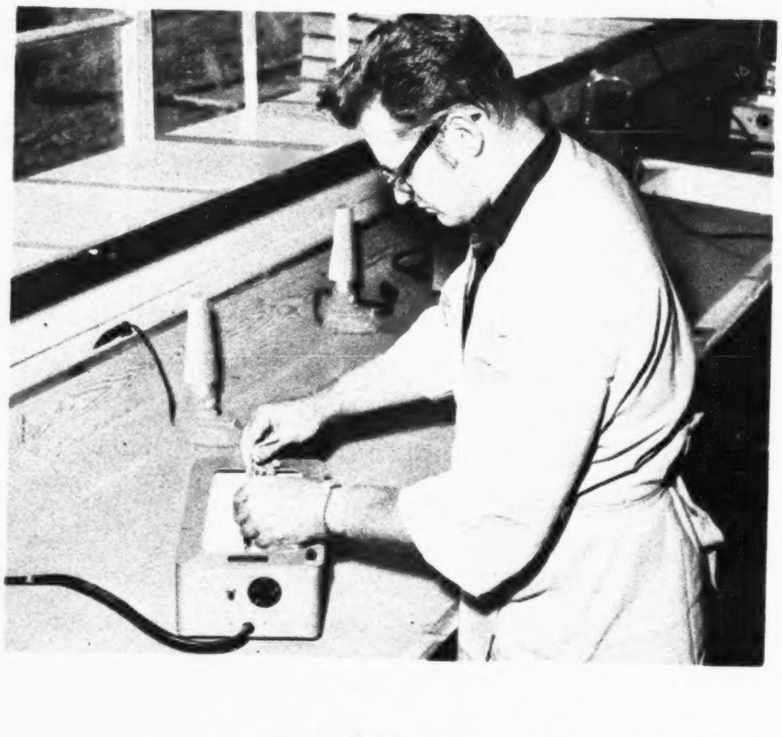
The machine bevel-edging operation.

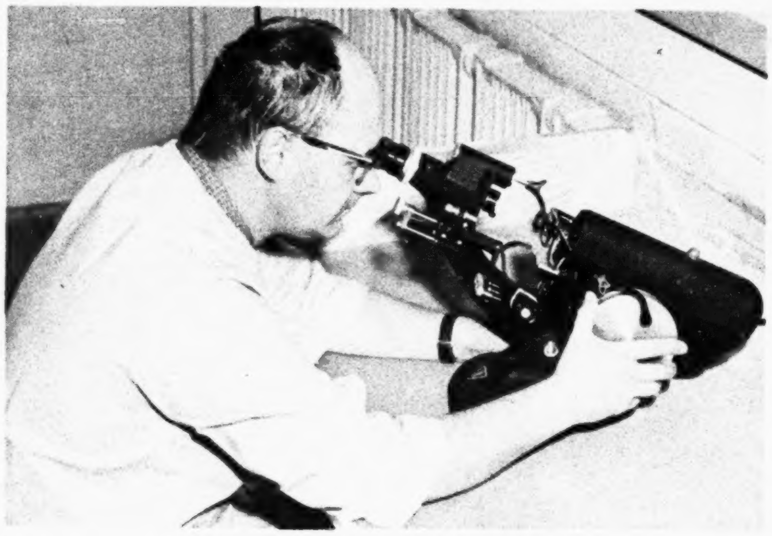
The total of 720 laboratory hours includes approximately 150 hours in simulated mass-production practice. Classroom hours amount to 360, bringing the total classroom and laboratory hours up to 1,080.

Equipment Used for Training

Layout marker
Hand sphere machines
Automatic cylinder machines
Vertometers
Rimless edgers
Blue and white hand stones
Lens-hardening unit, drop-ball test
Soldering machine
Lens drill
Lap cutter
Lensometers
Automatic stone and diamond V-bevel edgers
Salt frame warmers
Hand grinder
Frame buffing wheel
General storage cabinets and drawers
Ophthalmic hand tools and pliers

Inserting the lens into a plastic frame.





Final inspection.

Frame and lens stock cabinets
Bench space for machines and bench work
Cylinder laps and racks
Donated frames and lenses
Lens-blocking device
Automatic sphere machines
Lens generator
Chilling unit
Block cleaner
Lens cutters
Frame stretchers
Trim drill
Lens groover
Sphere laps and racks

Career and Employment Opportunities

Trained technical workers in the optical field are in demand, and excellent opportunities are available to the graduate. Because the trained graduate has received a thorough background in both theory and laboratory skills involved in lens manufacture, he is in an excellent position to advance rapidly to supervisory responsibility. Although the graduate normally begins his employment as a laboratory technician, he may advance to a position as laboratory foreman or supervisor, branch manager, or field representative of an optical company.

The graduate of our one-year program is not obligated to any firm, but if he elects to work for the House of Vision, Inc., he continues his training with House of Vision for one year. This additional year allows the student to apply the knowledge and skills obtained during his attendance at school. This period is highly significant because the student will be learning under actual job conditions, while being paid for his efforts.

Many employment opportunities for graduates result from the retirement of older opticians, the scientific advancement in the profession, and the increasing concern for proper visual care. New opportunities are constantly being made available in suburban areas. Qualified dispensers and specialists in this professional area are in great demand. The training opens a variety of specialized employment opportunities. Emphasis is placed on the efficient performance of all phases of grinding, polishing, edging, and mounting which the graduate may be called on to do.

Training Diesel Technicians at Williamsport Area Community College

By Donald M. Flynn

Diesel Instructor,
Williamsport Area Community College,
Formerly Williamsport Technical Institute,
Williamsport, Pennsylvania

WITHIN the last few years, there has been a change in the attitude of prospective employers of diesel technicians. No longer do they ask, "What experience have you had?" Today they ask, "Have you had a technical school background?"

Why this change? Mainly because employers are beginning to realize that a student needs a strong practical *and* theoretical background if he is not only to be able to understand present-day mechanical problems but also to be equipped to adjust to new mechanical advances that are inevitable in a rapidly expanding technical world.

With the complexity of modern diesel engines and diesel-powered equipment—fuel-injection systems, hydraulic isochronous governors, fluid couplings, power-shift transmissions, hydraulics, planetary gearing, pneumatic brakes, etc.—it is apparent that a good program in diesel technology must not de-emphasize the practical aspects of training. Academic work, while important, should not be overemphasized.

An effective program in training diesel technicians, according to the basic assumption at Williamsport Area Community College, formerly known as Williamsport Technical Institute, is one that can successfully place the student on the job. And the "job" in this case can be found in one of two areas: as a technician in one of the many fields of diesel applications or as a diesel engineering aide in research and development work.

To ensure that a student will succeed as a diesel technician, Williamsport has set up certain prerequisites and tests before he is accepted in the curriculum. The individual should have had a high-school program which has included at least two years of algebra. Physics and chemistry are desirable but not necessary. The entrance requirements are somewhat flexible to allow students with varying backgrounds to adjust to the demands of the course.

Above-average mechanical aptitude and interest, plus some spatial relations and math ability, are definitely prerequisites for the field of diesel technology. The following tests are given by the college for entrance in this course, with the raw scores shown at the right being the critical level for enrolment:

The Mechanical Comprehension Test (Bennett-Form AA)	38
The Revised Minnesota Paper Form Board Form AA	38
The Williamsport Math Aptitude	24

Students who find they are unable to meet the academic standards in their training are advised to continue training in the diesel mechanics course, also offered by the college.

The diesel-technology course consists of 2,624 class hours of work, comprising 72 credits. The courses are arranged as follows:

First Semester	*Class Hours*	*Credit Hours*
Hand and Machine Tools and Bench Work	96	2
Engine Principles	96	2
Power Train	48	1
Engine Maintenance	144	3
Electrical Systems	144	3
Economics	48	3
Algebra 1 and 2	48	3
	624	17

Second Semester	*Class Hours*	*Credit Hours*
Engine Principles	48	1
Combustion, Fuels, and Injection Systems	96	2
Power Train	96	2
Engine Maintenance	144	3
Electrical Systems	144	3
Trigonometry 1 and 2	48	3
Written Communication	48	3
General Drafting	96	2
	720	19

Third Semester	*Class Hours*	*Credit Hours*
Combustion, Fuels, and Injection Systems	192	4
Vehicle Maintenance	48	1
Engine Maintenance	96	2
Introduction to Acetylene Welding	96	2
Introduction to Electrical Welding	96	2
Physics	64	4
Oral Communications	48	3
	640	18

Fourth Semester	*Class Hours*	*Credit Hours*
Engine Maintenance	144	3
Pumps and Accessories	288	6
Testing and Power Measurement	96	2
Electricity and Magnetism	64	4
Heat and Light	48	3
	640	18

Practical Training

The practical aspect of the diesel-technician curriculum at Williamsport Area Community College includes both organized classroom instruction and practice in the shop. About 20 percent of the shop time is devoted to teaching the "how and why" in the theory classroom. Eighty percent is spent in the shop on actual practice in testing these theories.

A student in the diesel technology course at Williamsport Area Community College is shown completing the assembly of a diesel engine.

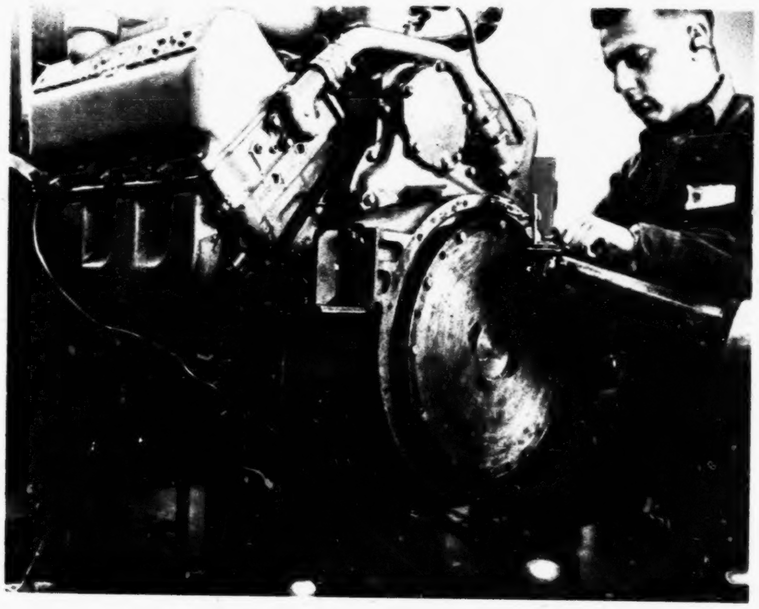
In the theory room, the instructor explains manipulative and related information. Films, charts, models, and demonstrations are used to clarify points difficult to understand. The importance of this practical "theory" part of the training is stressed by officials of the College, who feel that it promotes effective student comprehension.

To provide actual practice "on the job," Williamsport has a diesel shop that comprises 8,000 square feet of floor space. This space is filled with a variety of engines, ranging in output from 5 to 250 hp. They afford the student comprehensive training in all phases of engine maintenance. It is here that he can practice proper methods of engine disassembly, inspection, and reassembly as well as learning the principles of operation and construction of diesel engines.

A separate shop is devoted to training in the area of fuel injection and governors. Three modern test stands provide means to test the pumps and governors. To round-out the practical training, courses in welding and automotive engine tune-ups are provided.

A course in dynamometer test procedures is offered in the fourth semester of the curriculum. In this course, designed to make all previous training more effective, the technician tests overhauled diesel engines (overhauled by diesel mechanics in the College in their course on service and operation of heavy

Practical knowledge is gained as this student makes governor and pump adjustments on an American Bosch four-cylinder pump.



A Williamsport diesel-technology student checks engine alignment to electric dynamometer with dial indicators and special fixture.

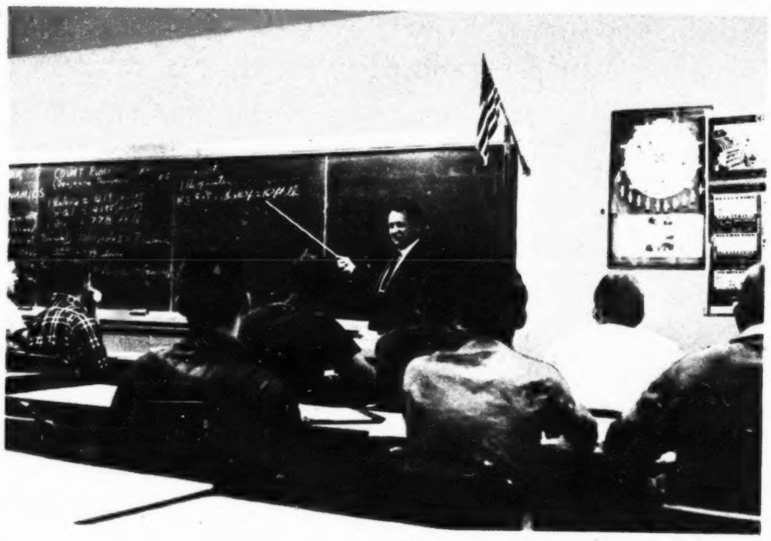
equipment), checking to make certain that engine power requirements are met and making necessary adjustments.

Related Subjects

In addition to the practical aspects of training in the diesel-technology curriculum, students take a number of related subjects designed to help them in their vocation. These include mathematics, economics, physics, and technical English.

Diesel-technology students are required to take both algebra and trigonometry. Both are given in two eight-week courses. In the algebra courses, the student learns how to solve any equation that might be encountered in his work. The trigonometry courses, which include the use of slide rule and logarithms, consist of many practical shop problems.

In addition to the practical courses, diesel-technology students take a number of related subjects, including mathematics, economics, physics, and technical English, all designed to help them in their vocation. This is a class in physics.



Since a technician's success in his profession will sooner or later reflect his ability to communicate accurately and concisely with others, the technical English course offered at Williamsport aims to improve this ability—both orally and in written form—through analysis of communications techniques and their application in assigned practice. Extensive effort is devoted to orderly thought development, paragraph construction, and word selection, as well as to methods of theme and report writing.

The development of the diesel industry was initially made possible as a result of findings in the science of physics. Further progress in the technology is dependent on new research and the application of science to this field. Because of this, the diesel-technology students at Williamsport are given a course in the basic principles of mechanics and heat. This gives the student an opportunity to study in a related academic class some of the theory which underlies the procedures he engages in as he works on the diesel engines.

Success of the Program

Williamsport is proud of the fact that 100 percent of all its diesel-technology students have been placed in industry. Graduates of the course are presently working in many states of the union and in some foreign countries in the stationary engine field, in highway transportation, in construction, and in diesel engine industrial plants. The former students write that their training at Williamsport has enabled them to be promoted to responsible jobs.

The companies employing the graduates of the school are also contacted periodically. This is done to determine their needs for men and to discover what changes, if any, are needed in the training. Only in this way can we be sure that the diesel-technology course at Williamsport Area Community College is keeping in step with the changes in industry.

Training Environmental Sanitation Assistants at Ferris State College

By David H. McMullen and Richard D. Hunter

**Instructors, Environmental Health Training,
Ferris State College,
Big Rapids, Michigan**

BEARING mute testimony to the continued development of Ferris State College's relatively new Environmental Sanitation Assistant (ESA) Program, was a recent occurrence which saw two generations of Ferris students meet face-to-face under interesting and mutually gratifying circumstances.

Embarking on the field-internship phase of their training, a pair of current enrolees derived understandable pride and pleasure from the fact they were met at their assigned work station by a pair of FSC graduates, now highly regarded assistant sanitarians on the staff of the Muskegon (Michigan) County Health Department. The latter had been entrusted by their MCHD superiors with conducting a portion of the cooperative instruction furnished the FSC trainees during a six-week tour of duty as health-team interns.

At Ferris, the following significance is attached to this milestone (subsequently duplicated at a number of other locations in the state):

- The college's ESA program has now matured to the point that successive waves of Ferris-trained manpower are joining forces on health-vital fronts.
- The proficiency of the program's graduates is such that they, in turn, are participating in the training of additional talent.
- The cooperative training phase has earned its field-tested spurs . . . as is perhaps amply evidenced by the fact that the above-mentioned pair of Ferris alumni began their Muskegon careers as MCHD-assigned interns.

An accurate grasp of the nature of ESA training at Ferris requires an awareness of the fact that the program's basic technology—sanitary science—has its roots grounded in the field of communicable disease and its extensions in modern man's depredation of his environment. The program's product—the assistant sanitarian—is the much-needed bridge between the layman and the expert in the field of environmental control.

Origins and Early Development

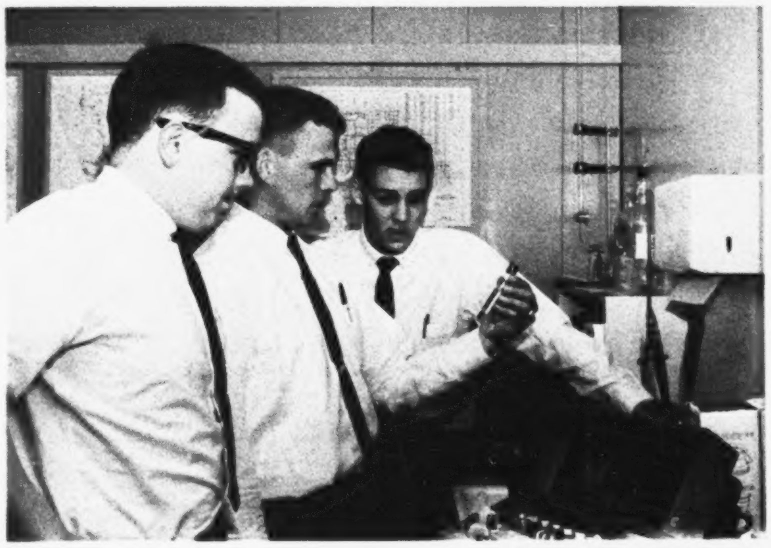
Ferris State evidenced its recognition of the need for the technician in this field in 1956 when, at the request of the health professions, it embarked on an in-depth investigation of the role that such personnel might assume within the existing structure of the public-health team. In the ensuing study, such phenomenons as the fomenting population explosion, the rapid burgeoning of industry, and the steady spread of suburbia combined with other factors to document the need for the training of technician teammates to assist the sanitary engineer and the sanitarian. It was patently absurd to expect the field's professionals to continue to "go it alone" in their struggle to cope with a rising tide of problems and projects.

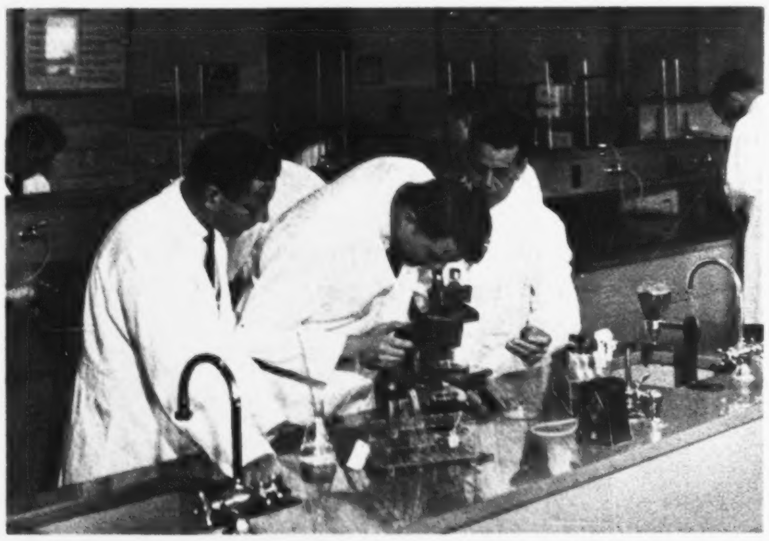
As conceived during the curricular planning, water, food, waste, air pollution, pests, and pesticides were to furnish the technical subject matter for the fledgling program. Related studies would focus sharply on people, their needs, motivations, backgrounds, and how they might be influenced to contribute to environmental-health progress.

The resulting curriculum was of pioneering significance. While there were several offerings around the country designed to meet the educational needs of professional sanitarians, there was a prevailing void in formal campus instruction geared to training technician-level careerists. As is true of many of the offerings now encompassed by the pattern of education at Ferris, the ESA program was targeted at producing technical assistants equipped to handle specific assignments.

Another tactic common to all such pioneering ventures at Ferris was the early formation of an ESA "professional advisory committee," comprised of persons of recognized prominence in public-health and health-related circles. As is also true of similar panels supporting FSC career courses in other areas, the ESA committee has continued to contribute to the program's development in many ways, including participation in the structuring of specific courses of study, the recommending and delineating of professional credentials needed by candidates for posts on the teaching staff, and the furnishing of a wide variety of support in the field.

Two Ferris College students in the environmental sanitation (ESA) program flank a graduate of the program, who acts as an instructor in the cooperative training furnished the interns.





Modern classrooms and laboratories facilitate the accent on combining practical training with a thorough grasp of theory offered by the ESA program at Ferris State College.

Curriculum

As can be seen from the current roster of subjects set forth below, the two-year program features a balanced blend of general-education and science courses, with the latter heavily weighted toward biology.

FIRST YEAR

	Quarter Hours Credit
Term 1	
Orientation to Environmental Health	2
The Living World 1	4
The Physical World 1	4
Mathematics	3 or 4
Communication Skills 1	3
Continuing Orientation	1
Health and Physical Education	1
	18 or 19
Term 2	
Environmental Health Practices 1	3
Environmental Health Techniques	3
The Living World 2	4
The Physical World 2	4

Communication Skills	3
Health and Physical Education	1
	18

Term 3

Public Health Materials	2
Man and Society 1	3
Principles of American Government 1	3
Principles of Human Personality	4
Communication Skills 3	3
Health and Physical Education	1
	16

SECOND YEAR

Term 1

Environmental Health Practices 2	3
Microbiology 1	4
Human Physiology	5
Principles of American Government 2	3
Personal and Cultural Appreciation 1	3
	18

Term 2

Environmental Sanitation	3
Water and Sewage	3
Parasitology and Entomology	3
Microbiology 2	4
Drafting and Plan Reading	2
Elective	3
	18

Term 3

Restaurant and Milk Sanitation	3
Food Preservation and Meat Technology	3
Public Health Seminar	3
Cooperative Work Experience	8
	17

In important instances, the ESA technical courses are structured and sequenced to acquaint students with the practical applications of subject matter given broad coverage in the general-education courses. For example, the courses in environmental health practices pinpoint the ESA applications of material first covered in general-education offerings designed to provide an overview of socio-economic problems and political-science principles.

As is perhaps apparent from their titles, a number of the technical courses—such as restaurant and milk sanitation, water and sewage, etc.—focus sharply on specific elements of the field's technology.

Sustained Stress on Technology

By design, at least one technological course is offered each quarter, thus placing the student in continuing contact with one of his program advisers as well as in constant touch with specialized ESA subject matter. It is felt that this feature has much to do with the program's success, since it has served to sustain a high level of individual student interest in the basic technology throughout his campus stay.

All the technological courses feature a combination of lecture sessions and laboratory work. The program emphasis, however, is on the latter. The laboratory sessions are carefully designed to steep the student in standard lab procedures, thereby giving him a supervisory insight into the mechanics of lab work and equipping him for assignments requiring accurate interpretation of lab reports in the field.

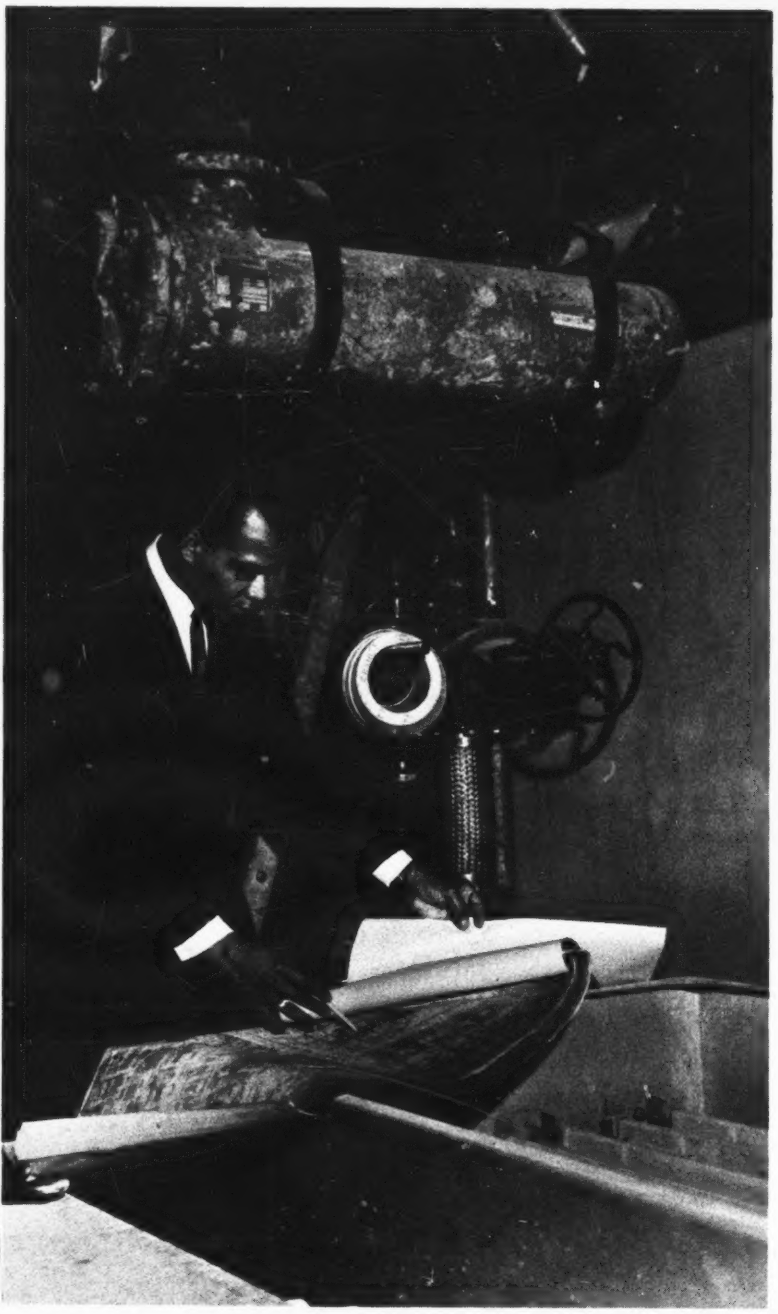
Cooperative Internship Program

Another major factor in the program's success has been the six-week cooperative internship program mentioned at the outset. With the enthusiastic assistance of members of the ESA professional advisory committee, working relationships have been developed with a statewide roster of municipal and county health departments providing for an invaluable period of field instruction for all program enrolees during their final quarter of study. These local departments, approved for field training by the Michigan Department of Health, have imparted to their role in each cooperative arrangement a degree of professionalism which has insured effective results.

In a tactic which serves to underscore the cooperative nature of the undertaking, the college's ESA instructors meet frequently with the interns and supervising sanitarians throughout the training. Following completion of their internships, the students return to campus for a two-week seminar in which their individual experiences are analyzed and evaluated.

A partial indication of the success of this cooperative phase is evidenced by its seven-year record of attracting ever-increasing participation—from six departments and seven students in 1959 to 12 departments and 25 students in 1965.

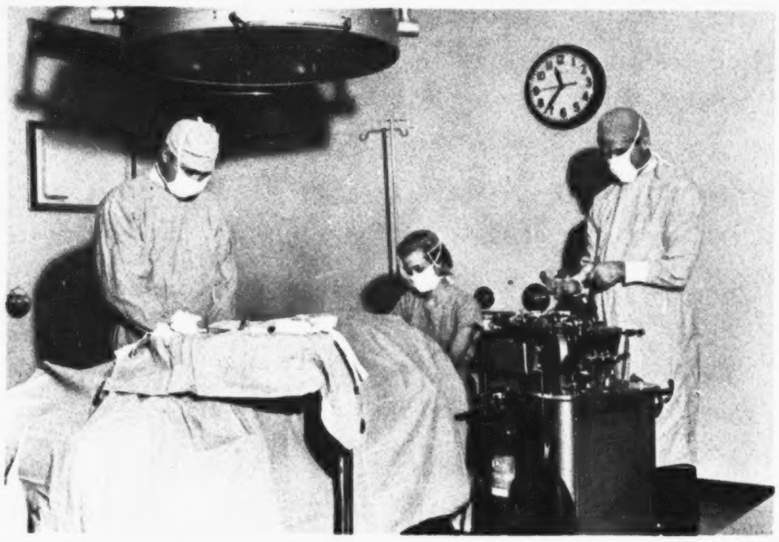
Worthy of passing note is that this on-the-job instruction is supplemented by a number of field-training experiences furnished prior to a student's entering this phase. Visits to a variety of institutional and industrial field installations form the most common element of this program emphasis.



Faculty

Each of the ESA faculty members is a registered sanitarian holding a master's degree in environmental health. Not the least accidental is the fact that they jointly strike an excellent balance in terms of special fields of interest, with one instructor having a specialist's background in biology and entomology and the other in chemistry. A collective total of 16 years of field experience with state, local, and federal health units gives the instructional staff a fund of personal experience from which to determine program direction.

Moreover, because of the rapid changes taking place in sanitary science, a conscious effort is made by the staff to keep up to date through selected work-study programs in various technological areas during the summer months.



Field visitations acquaint the ESA trainee with a wide range of technical assignments. They include: (left) the checking of industrial water systems; (above) the measurement of airborne bacteria at a community hospital; and (below) the testing of levels of illumination in libraries and schoolrooms.

Entrance Requirements and Graduate Placement

Admission to Ferris State College is based on, among other things, a maturity of attitude, a seriousness of educational purpose, and demonstrated ability to profit from a specific course of selected instruction. With the help of a comprehensive set of aptitude and ability examinations, incoming students are counseled toward academic goals compatible with their capabilities.

The ESA program requires graduation from an accredited high school. A good background in the biological and physical sciences, while not essential, is particularly helpful. On the successful completion of his two years of training a student is awarded the Associate of Applied Science degree.

While placement of ESA graduates has been primarily with local health departments in Michigan, there are alumni of the program now at work with departments in Wisconsin, Ohio, Illinois, and New Jersey.

In addition, there have been a number of placements with specialized environmental-control agencies, such as water-resource commissions, air-pollution control units, and housing commissions. Also, the food industry is finding the FSC graduate particularly adept at helping solve some of its quality-control and maintenance problems.

Evidences of Program Proficiency

In 1964 the Michigan legislature passed an act providing for the voluntary registration of sanitarians. The essential importance of this act was that any person practicing in the field at the time of its enactment could win professional registered status by passing a written examination without satisfying the stringent education and field-experience requirements (seven years of college, plus extensive professional employment) that would be mandatory after that time. It obviously speaks well for the Ferris program, that, without exception, all of its Michigan-employed graduates passed the exam and are now registered.

With respect to how many of the graduates have retained their career interest in the field, a recent survey indicated that more than 90 percent are actively engaged in pursuits directly related to their Ferris training, either at work in one of the public agency-type posts described previously, or taking advanced educational training leading to an upward move in professional status.

This advanced training is now available at Ferris in the form of a four-year Bachelor of Science degree program in environmental health. Representing a natural outgrowth of the development and refinement of the ESA program, the four-year offering has two prerequisites for admission: (1) an applicant must have completed the ESA program, and (2) his background must include at least nine months of practical experience in public-health work. These requirements serve to insure that the returning student will benefit to the greatest extent possible from advanced training.

Future Growth and Development

All signs point to a continuing increase in the need and demand for products of the ESA program. Concrete action on this projection is now taking place in the form of Ferris State's construction of a $2.5-million technical arts building, part of which will serve as the new headquarters for ESA instruction. Comprising an integral component of the five-story structure will be a classroom-laboratory-office complex engineered to meet the joint needs of the two-year and four-year programs. Among the special facilities slated to occupy the component's more than 4,000 square feet of floor space are a fully-equipped environmental health laboratory, a bacteriology laboratory, and a radioisotope facility.

Bolstered by this physical expansion, the ESA faculty and advisory committee foresee a beckoning period of enrolment growth and program enrichment. There is little doubt that Ferris State College is attuned to a national need in its stepped-up efforts to help staff the public-health front with career technicians.

Section 8

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Issues, Problems, and Proposals

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Training for Engineering Technicians

By A. C. Bodeau

**Manager, Vehicles Testing Laboratory,
Engineering and Research Staff,
Ford Motor Company,
Dearborn, Michigan**

THE Ford Research and Engineering Center regards the technician as an important member of the engineering team, with responsibility for a large number of operational functions such as designing, fabricating, assembling, testing, and the reporting of data. In relation to what he does on the job, there are special talents, capabilities, and training we feel he should have. In large organizations such as ours, the division of labor generally permits the technician to specialize in a few of the more directly related duties. However, it is the technician's ability to perform a broad range of technical duties which makes him a productive and valuable member of the engineering team.

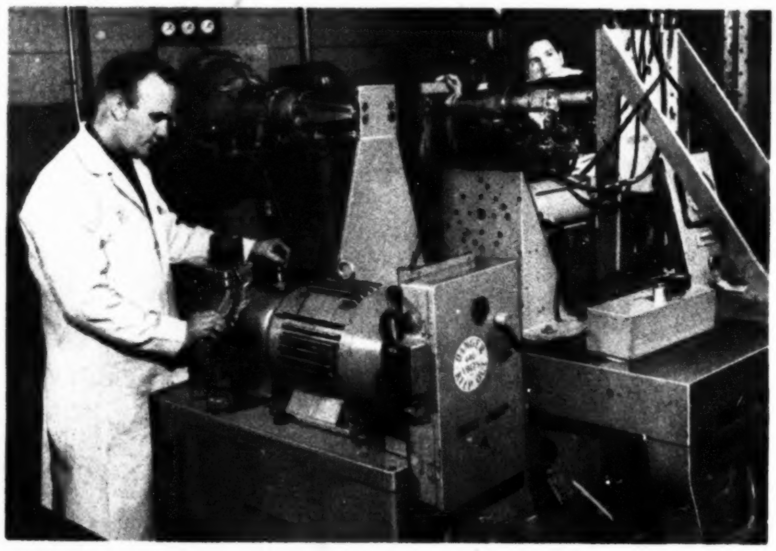
Our more competent technicians are generally outstanding in technical knowledge and manual skills. The characteristic most essential to the competent technician is technical knowledge about the components to be tested and the equipment to be used. Manual skills are a highly essential quality for an engineering technician, and it is technical knowledge that directs the effective application of these skills. The fabrication, inspection, assembly, and adjustment of experimental components is generally performed by technicians. In this work the technician has continual use for, and must develop skill with, hand tools as well as basic machine tools and fabricating equipment.

Technicians on "Hurricane Road"

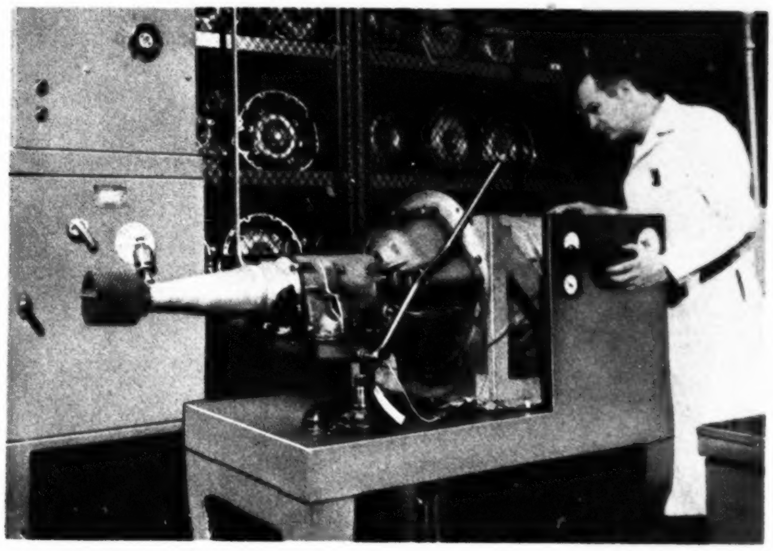
The operations in one of our specialized environmental test facilities used for the development of our cars and trucks illustrate the type of functions fulfilled by technicians. "Hurricane Road" is the name of our climatically controlled wind tunnel in which tests are conducted under extremely high temperatures and simulated blazing sun in the course of an hour.

The tunnel is capable of subjecting a vehicle to wind velocities up to 140 miles per hour by means of a five-bladed, 24-foot diameter fan powered by a 2000-horsepower variable-speed electric motor. Heating and refrigeration systems provide ambient air temperatures ranging from 0° to 160° F. The vehicle can be driven at speeds up to 120 miles per hour on dynamometer rolls which will absorb up to 250 horsepower from the vehicle. We can even control the tunnel atmosphere's relative humidity, and simulate rain with water spray nozzles.

These capabilities enable us to test our cars and trucks in the laboratory under a wide range of environmental test conditions against pre-established standards of performance for engine and transmission cooling; heater, defroster, and air-conditioner effectiveness; aerodynamic stability and drag; wind noise; resistance to fuel vapor lock; and fuel octane requirements of the engine.



Technicians perform torque-cycling test on automatic transmissions.



An automatic transmission seal is tested inside a perforated safety shield in the Ford laboratory.

This tunnel generally is operated 16 hours a day, five days a week, but during peak-load periods it is operated around the clock, seven days a week. Tests to be performed are specified by the vehicle development engineers who supply the vehicles. Most tests are conducted to standardized procedures developed by test engineers. The preparation and installation of the vehicle, the performance of the tests, and the recording, computation, and reporting of the data is the responsibility of technicians.

As part of the test preparation procedure, it is necessary that the control and measurement instruments be calibrated so that accurate test data may be assured. This operation requires that the technician understand and be capable of performing the calibration procedures for a wide variety of electronic, hydraulic, and mechanical instrumentation.

In preparing the vehicle for tests, the technician checks it for conformance to specifications, including a close check on experimental components for proper installation and adjustment. The technician also performs any corrective work which may be required.

Mechanical Skills Needed

To perform this function, the technician must have a thorough knowledge of the operation, installation, and adjustment of a large number of automotive components, and be reasonably skillful with mechanics' tools.

As part of vehicle preparation, the technicians instal test instruments such as thermocouples and pressure gages in the car for required measurements. This frequently requires that some components be disassembled and reworked so that instrument-sensing elements can be located in the most critical sections of the components being tested. To perform this work, it is important that the technicians have a basic knowledge of instrumentation as well as automotive mechanics.

On completion of vehicle preparation, the technician installs the vehicle in the tunnel. The car is driven or pushed into the tunnel and accurately located on the previously calibrated chassis roll dynamometer, or on the air bearings used to float the car for aerodynamic measurements.

Connected to the engine is a special fuel line, connecting a fuel flowmeter on the operator's console to a battery of underground storage tanks containing specially-blended fuels. The technician must make certain that the fuel specified by the engineer is proper for the particular test to be conducted. The previously installed instrument-sensing elements are plugged into a switchboard connected to the indicating instruments on the operator's console. An electrically driven actuator, which operates the car accelerator pedal by remote control from the operator's console, is installed and test preparations are then complete. For these functions the technician must have a working knowledge of instrumentation, automotive mechanics, and a knowledge of basic fuel characteristics and their relationship to test requirements.

The technicians operate the tunnel facilities and vehicle on a closely controlled schedule of loads, speeds, and ambient temperatures specified by the test procedure. The operator dials the prescribed settings and observes the performance of the tunnel and the response of the car by means of controls and meters on the operator's console. The operator must maintain constant vigilance to assure that the literally hundreds of operating conditions of the car and tunnel are to specified values and do not exceed safe limits. Monitoring the performance of the vehicles, facilities, and instrumentation he operates and surveying the data for accuracy requires a very intimate knowledge of the operating characteristics of the car, tunnel, and instruments.

For most tests, the data on tunnel test conditions and car performance are measured by the instrument-sensing elements and automatically typed on prepared data sheets by a data logger. A second technician observes the data as it is recorded by the logger and starts data computation and graphs; he may even start the data report while the test is in progress. Generally, the data are developed so rapidly that computations cannot keep pace. In such cases the test file, containing a complete description of the test, the procedure, and the partially computed data, is delivered to a group of technical writers who specialize in data transcription, computation, graphing, and the writing of data reports. These men complete the development of the data and write a data report to the requester. For the computation of data, the technician is expected to have a working knowledge of algebra and trigonometry and the ability to use a slide rule and desk calculator with facility. It is necessary that the technical writers understand the test procedures and the character of the data developed so that the data can again be checked for accuracy as the report is written. Obviously, the technical writers are expected to write readable reports, employing correct grammar and spelling.

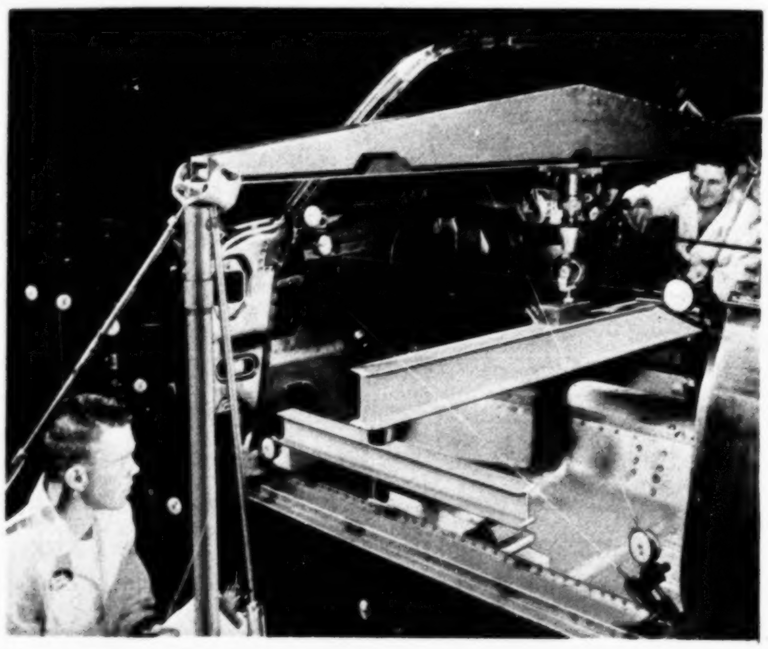
Technicians Are Specialized

The wide range of tests conducted, and the tremendous variety of test equipment and instrumentation used, make it impossible for a test technician to be competent in all phases of the work. Thus, we require technicians to specialize in the testing of certain components of the car, such as engine, body, transmission, and tires. In support of, and extending the activities of the test technician, we also have technicians who specialize in areas such as electronic instrumentation, metallography, computer programing, and fuel analysis.

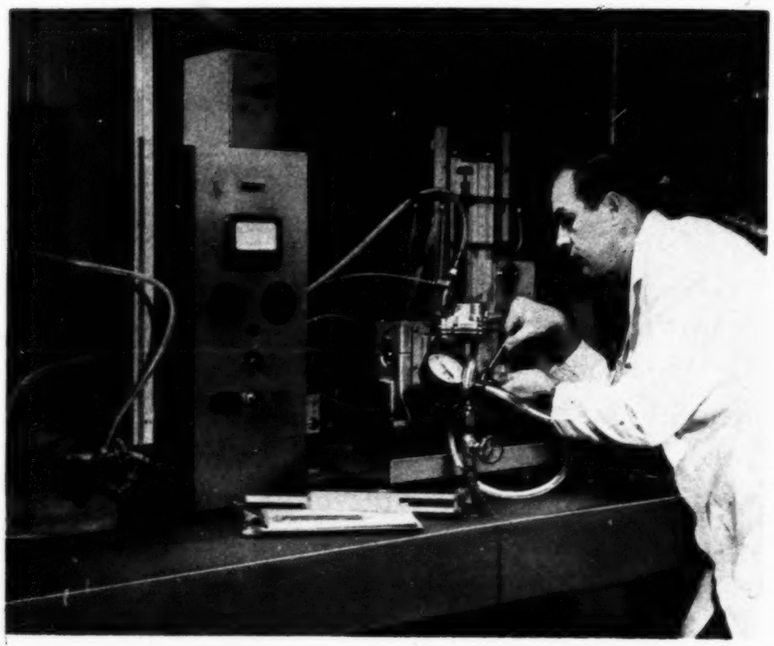
The examples discussed have been limited, for the sake of brevity, to a very narrow segment of automotive testing. Nevertheless, the broad scope of duties, and the wide variety of equipment described are typical of many other test areas and illustrate a need for versatility on the part of all of our technicians. Also, the demand for a particular type of test, or the use of a particular facility, varies radically from time to time. Thus, it is necessary that our technicians be versatile so they can shift assignments without excessive loss of efficiency.

Our discussion has centered around the test technician; however, designing, drafting, and illustrating are related activities wherein technicians with highly developed manual skills perform a function of major importance to the engineering team. Although the

Technicians concentrate on body structural testing.



Fuel pumps are tested with skill and accuracy.



designer's manual skills are somewhat different from those required by a test technician, his requirements for technical knowledge are very similar. The creativity and technical knowledge required for effective designing are typical of the abilities we wish our technicians to apply in all our activities.

The scope and depth of technical knowledge and the level of manual skills we would like our technicians to bring to their work is generally greater than that which can be obtained in high school. Thus, further training in junior colleges or technical institutes is highly desirable. This additional technical training should include at least the following basic courses:

Machine Construction.—A course which would teach basic machine construction, good practice in the assembly and disassembly of machinery, and the proper use of related hand tools would be very useful.

General Fabricating Shop Practices.—The student should obtain at least a minimum of working experience with basic machine tools, soldering, brazing, and welding techniques. He should also develop knowledge of the working characteristics of materials.

Basic Mechanical Drawing.—The trainee should develop the ability to read and understand drawings and layouts, and to make accurate and reasonably neat drawings and sketches of simple mechanical components.

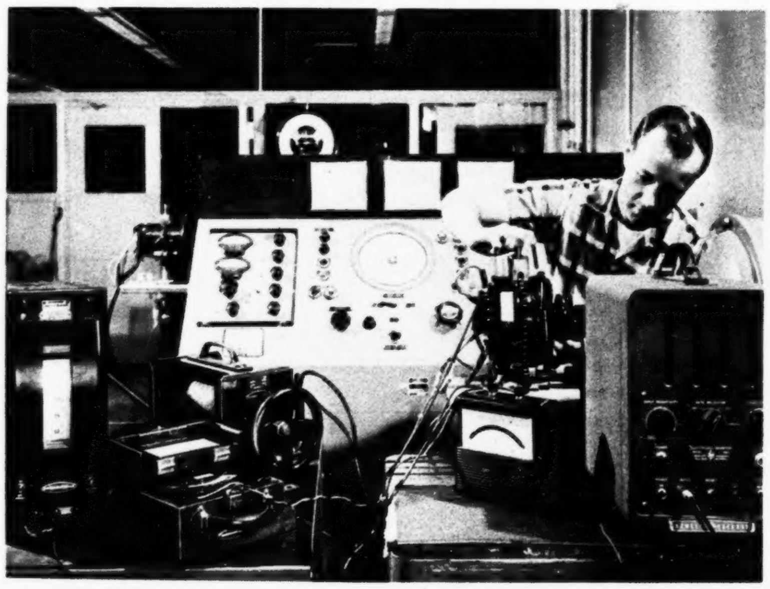
Mathematics and Computational Methods.—Courses in advanced algebra and trigonometry should stress their application to practical problems. As technicians are frequently called on to perform numerical computations, it is important that they develop a working ability with a slide rule and at least one type of desk calculator. They should also develop proficiency in tabulating data and drawing graphs and charts. A conceptual acquaintance with calculus, analytic geometry, and statistical analysis should suffice for most technicians. Students who demonstrate particular interest and aptitude in mathematics could later be given further training in these subjects preparatory to computer operation and programing.

Physical Sciences.—Physics and chemistry courses beyond high-school level should be provided to give the student technician the necessary background for more specialized technical courses involving the application of scientific principles.

Engineering Testing.—A course which would outline the basic concepts of testing and explain the relationships and objectives of field and laboratory testing would be most useful. The basic principles of the major types of test equipment should be explained and demonstrated.

Above: Specialized knowledge is utilized in the testing of hydraulic components of automatic transmissions.

Below: Instrumentation techniques are applied in generator adjustment and testing.

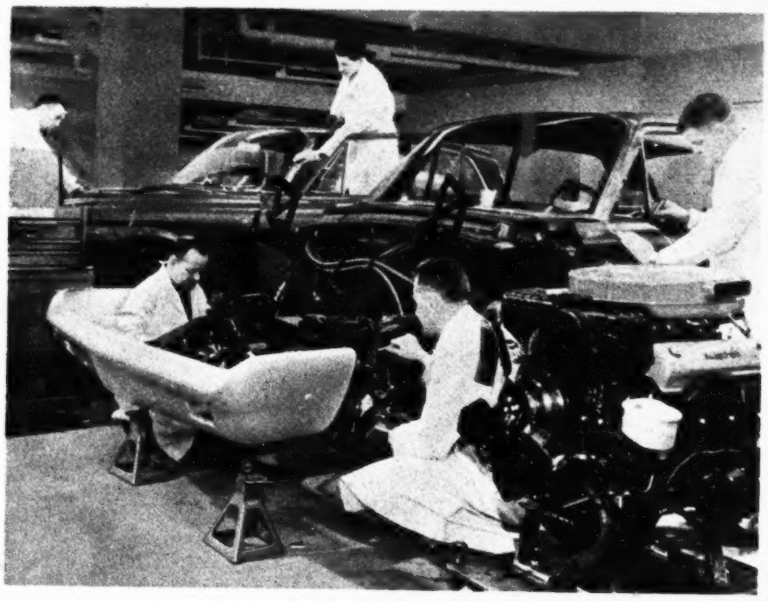


Instrumentation and Measurement.—Modern instrumentation has made possible such precise and convenient measurement of product performance that the use of instruments and measurements has become a very important part of the technician's work. This course should explain the basic measurement concepts and the application of basic types of instrumentation.

Report Writing.—A course to provide training and practice in report writing would be very helpful.

We believe the foregoing would constitute technical core courses which would be useful to almost all engineering technicians. They form a background which would interest most prospective employers of technicians because they would prepare the student to be more effective when he becomes employed and should help him absorb the maximum from on-the-job training and experience.

Two other areas in which technicians often require training are product familiarization and technical specialization. Knowledge of the product on which the technician works is very important to his effectiveness and understanding of the objectives of his work. It is difficult for most student technicians to predetermine their ultimate field of employment. Thus, courses in product familiarization, which by their very nature must be more specialized than the core courses outlined, might well be taken after the technician becomes employed. Further training in advanced mathematics and the physical sciences, as well as in areas of technical specialization, such as metallography, dynamometry, advanced drafting and design, electronic instrumentation, or experimental stress analysis might also be undertaken after employment so that they too can be best selected to suit the individual technician's needs and proclivities.



Manual dexterity is important in maintaining dimensionally accurate, full-scale models of prototype cars.

We realize that the recommended courses are not as advanced as those advocated by many educators. We know, however, that courses which stress applications and the development of manual skills, which seem to be given less and less attention in modern curriculums, are very important for the development of the technicians we need.

Technical Education for the Graphic-Arts Industry

By Samuel M. Burt

Executive Secretary,
International Graphic Arts Education Association,
Washington, D.C.

AN entirely new concept of education for the printing and publishing industry has been developed through studies of the International Graphic Arts Education Association and a number of junior colleges and technical institutes, aware of the technological changes affecting the printing, publishing, and related industries.

Training of technicians for the graphic-arts industry is certainly needed, but printing and publishing is just one facet of a program which has tremendous potential for junior colleges and technical institutes—Visual Communications Industry Education.

As we have developed this concept we recommend a visual communications department which would include programs preparing students as technicians in such fields as:

advertising production
technical publication writing and production
newspaper, book, and magazine production
commercial art
commercial and industrial photography
printing plant and administration and production
visual-aids production
television and motion-picture graphics
cartography and map production
exhibits and displays production

The visual communications department would be organized into several separate programs, depending on the course offerings, e.g., printing and publishing, commercial art, visual aids, advertising production, photography. Students would take some courses in all these programs, but would major in their particular field of occupational interest. They would be prepared, on completion of their program, to either enter industry at a junior or assistant level in their field of interest or go on to a four-year college with a good part of their studies on a transfer credit basis.

Basic instruction for *all* Visual Communications Department students would be provided in the printing and publishing programs. The primary reason for this is that the printing and publishing industry is an engineering-design-manufacturing operation modified or oriented to artistic conceptions. Thus, it is basic to all visual communications activities. Secondly, there is a growing demand in the printing industry for personnel with technical training.

Students completing the printing and publishing program should be employable in such positions as assistant estimator, assistant production control supervisor, assistant purchasing agent, sales trainee, management trainee, assistant quality-control supervisor, assistant foreman, and so forth. Such positions would be open in commercial printing plants, newspaper printing plants, book manufacturing plants, publication printing plants, privately owned duplicating plants,

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Visual communications classes prepare students to become technicians in commercial and industrial photography.

and government agency reproduction and printing plants. There would also be job openings available with printing equipment manufacturers and suppliers, ink manufacturers, paper merchants, and paper mills.

It should be noted that many printing, publishing, and package manufacturers also employ commercial artists, designers, creative copy-writers, and technical writers. Thus, students specializing in these areas of the Visual Communications Department will find career openings in the printing and publishing industry. For those who prefer to become highly skilled craftsmen in printing plants, the printing and publishing program would offer skill upgrading as part of its evening-school program.

This technical-education program for the graphic-arts industry is part of the total communications industry, articulated from the junior high-school level through college. At the technical institute, junior college, community college level (the post-high-school two-year terminal program), we see a core program based on printing technology for printing-plant production technicians and administrative technicians. Thus, a technical institute or community college could well start with a program for printing-plant technicians and, as the needs of the local graphic-arts industry become known, could develop additional programs as described above, all within the departmental structure. It is quite possible that industry needs will determine other occupational areas which would logically fall within the scope of this department.

Since the core program is to be based on printing technology, the remainder of this report is devoted to and will emphasize the work of the printing-plant production technician and the administrative technician. It will highlight the knowledge and skills these technicians must have, and how these can be included in an educational program.

Even a cursory review of criterions for technician occupation and ability reveals that many individuals are functioning as technicians in a variety of graphic-arts industry activities. However, it is doubtful if we could identify them by job classification or under commonly agreed on job titles. In most instances, they may have been hired initially to do a nontechnical job, grew professionally as the company grew corporately, and are now performing as technicians even though the job title has no reference to technician.

How then do we develop an educational program for an occupational grouping when apparently it does not exist? We can establish several occupational groupings for the graphic-arts industry which are recognized at the technical level among printing-equipment manufacturers and suppliers as well as in the printing plants of newspapers, publishers, and commercial printers. The following discussion will be limited to the printing-plant production technician and the administrative technician.

The Printing Production Technician

The printing production technician working in the plant utilizes a variety of instruments involved in determining and specifying quality-control standards, register, humidity control, and so forth. He is responsible for determining that the established standards for each job are being met. Depending on the size of the plant, the number of departments, and the number of employes involved, there may be one or more such technicians or these technical responsibilities may be part of the front-line supervisor's function.

Regardless of the duties assigned him, the production technician must constantly be aware of the production problems involved in placing ink on paper and be prepared to specify the best ways to do it. The production technician must keep up-to-date on new techniques and new materials, be cost-minded and aware of the best work-simplification procedures, and be able to write instructions and communicate verbally with the people in the shop. His records must be ac-

Instruction in the use of quality-controlling instruments is important to the graphic-arts technician.

curate, and he must constantly study these records so that he can develop specific techniques and procedures for keeping production at a high level consistent with the quality demands of management. Finally, the technician must be intimately familiar with the use of the many technical instruments available in the plant for judging and controlling quality.

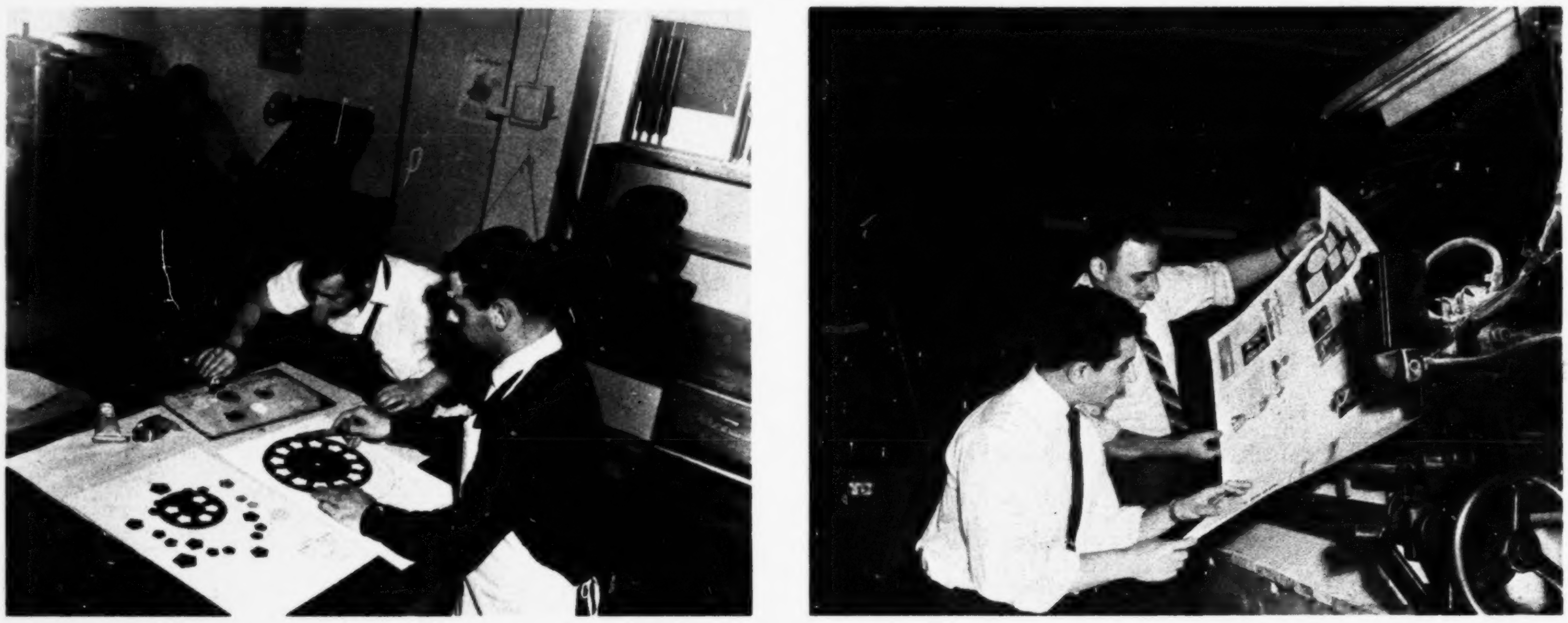
A possible area of responsibility for technicians in printing plants which should be clarified is the "handling of personnel." Instrumentation in the printing and publishing industry is still very much an innovation, and only a small group of the more progressive plants are making any serious efforts to integrate into their plant operation the benefits resulting from the use of accurate measurements and "scientific management." It is still true in industry, even in the most progressive plants, that the craftsman is "king" in his sphere of operation. Thus, any instructions for adjustments or changes in an operation coming from a technician in the plant will, for a long time, be in the form of recommendations and suggestions.

Even though management may be "sold" on technicians and their instruments, they will not permit the craftsman to be upset in a wrangle between the technician and the craftsman. The technician will have to prove and sell himself to the craftsman as a worthwhile aide and consultant. This is asking for a great deal from a person who must be, first and foremost, an expert with tools, techniques, and instruments rather than an expert in handling people. Nevertheless, for at least the next decade, our technicians will have to function in both capacities. Those who succeed are destined to move up quickly in the field of printing-plant management. The technicians who replace them may not need to be such paragons. But until that time, technical-education programs for the graphic-arts industry will require students who have a high degree of ability to get along with people and should include courses in human relations, selling, and personnel management.

Our basic premise for developing a technical-education program is built around use of instruments in the printing plant, thus there exists the problem of instruments versus equipment. Assuming for the moment that instrumentation for our industry is now sufficiently developed so that a technical-education program can be built around the number and variety of instruments available, must we also have operating equipment in the school program? The answer is obviously in the affirmative. To simply train a person in the use of an instrument, without providing him the opportunity to utilize it in a practical situation and to demonstrate the practicality of his findings and recommendations, would be a waste of time and of negative value to the student, the school, and the industry.

The technical student should develop an understanding of, and operating familiarity with, the equipment, techniques, materials, and processes of the printing and publishing industry. This means that a graphic-arts industry technical-education program should have a print-shop laboratory which includes, as a minimum, a composing room, a letterpress and offset-press room, camera and platemaking room, and a bindery room with craftsmen serving as instructors' aides. The instructors would be primarily technical men. However, neither the students nor the instructors would be called on to operate the equipment at a high level of competency or quality. This concept, unfortunately, has not yet permeated enough of those schools purporting to offer technical-education programs. Most of our so-called technical-education programs are merely glorified vocational-school programs, where the emphasis is still on becoming proficient in the operation of equipment.

Following is a partial list of instruments which the Lithographic Technical Foundation recommends for



Practical experience in the operation of graphic-arts equipment is part of the training of the printing production technician.

use in plants. To this list can be added other instruments developed specifically for use in the composing, engraving, electrotyping, and bindery departments, as well as instruments for specific use in letterpress, gravure, and other printing processes. This list does not include many specialized instruments available from commercial sources.

Instruments for the Lithographic Industry

Paper hygroscope
Register rule
Sensitivity guide
Inkometer
Blanket thickness gage
Pick tester
Ph control meter
Hygrometer
Densitometer
Magnetic packing gage
Color chart

The student who has completed a specialized technical education for the graphic-arts industry with respect to these and other instruments being utilized in printing plants should be expected to know:

The variety of instruments available for use;

How they are used and for what purpose;

The basic scientific principles governing their use and the basic scientific principles on which they were developed;

How to keep cumulative records of findings and to interpret these findings in terms of plant operations with the advice and assistance of management, engineers, and craftsmen;

How to diagnose his immediate readings, as well as his long-range interpretations in terms of changes and adjustments affecting handling of equipment, paper, ink, plates, chemicals, light sources, etc., so that quality and production standards are met;

How to establish quality and production standards based on his findings, records, costs, instruments, available plant personnel, etc., with the advice and assistance of management, engineers, and craftsmen.

The Printing Administrative Technician

It is important to arrive at some criterions and examples to differentiate between education and training for technical positions and management positions. The best way to describe this difference is to suggest that a student taking a two-year terminal course as an "administrative technician" would probably spend so much time in learning the Printing Industry of America's PAR, that when he went on the job he would already be fairly expert in its application. While a student in a four-year college course in printing management would have learned the uses and application of PAR, he would have to spend considerable time on the job before he became proficient in its use.

While we know that there are many people in printing plants performing these functions, we doubt that many of them are known as administrative technicians. The variety of titles given these personnel would probably result in a small dictionary of management titles, for these people are an important part of the "management team" of a plant. While our industry should lean heavily on the curriculum construction experience of college or university school of business-management educators in developing an educational program for printing administrative technicians, we also need educators who are experienced in developing the special type of programs offered in technical institutes, junior colleges, and community colleges.

We must not lose sight of the fact that one of the major objectives of these educational programs is to prepare the graduate to perform effectively, productively, and profitably on the job immediately after leaving school. On-the-job experience will contribute to his growth, but he should be a proficient worker, within reasonable limits, when he starts to work. He has not been trained to be an executive; he is a technician in a specific field and knows how to utilize the "tools of his trade" effectively in the performance of his specific duties. The concepts involved in this type of education have a closer relationship to an educational program for engineers than for general business administration, even though basic principles of business administration will apply throughout the entire educational program.

The printing administrative technician is involved in the handling of tools and instruments concerned with such specific functions as estimating, cost control, production control, inventory control, and traffic control, but not other front-office duties concerned with accounting, sales, finance, personnel management, office management, etc. The printing administrative technician must know how to specify and order paper, ink, plates, and other supplies connected with the production of a specific printing job. He must be intimately familiar with the various printing-production processes if he is to be able to determine and specify which printing process to use for a specific job. He must know how to measure and scale copy and know the production capacity of the various machines in the plant. He must be able to use the slide rule and various tables and charts to estimate time factors and costs of production for different types of printing jobs, figure out how much ink is needed for any particular job to be printed, and be able to use the PAR Tables of Printing Industry of America. He must have as his "bible" such other texts as *Printing Production Management, Estimating,* and *Cost Accounting.*

The printing administrative technician may have a combination of responsibilities involving the purchase of printing supplies. Not only must he have a thorough knowledge of all the terminology involved, the sources of supply, etc., but he must also know something about the function of a purchasing department (he may even be the whole department), kinds of records to keep, and other information usually taught in one or more college-level courses in purchasing. The basic principles of business administration must then be the core of the printing administrative technician's educational program.

In thinking of the printing administrative technician's job, we must not only consider the instruments he uses, but more important, the charts, scales, and complex mathematical computations he must undertake in the performance of his job. His instrument is, for the most part, the slide rule. It is the variety of charts to which he must refer, the computations he must make, and the detailed records he must keep in order to make the proper diagnoses and interpretations involved in his job which qualify him to be called a technician. The educational and training program to be developed for such personnel must incorporate practice in the use of the tables and charts and maintenance of necessary records which are basic to his effective job performance.

There is a definite need for a print-shop laboratory in the educational program for printing administrative technicians. While the laboratory need not be equipped as completely as the print-shop laboratory for printing production technicians, there is still the need for the administrative technician to acquire a familiarity with the equipment of his industry and its operation. Unlike the craftsman or the production technician, however, he need not learn to operate any of the equipment. He need only know the principles of its operation, the range of production capacity on various types of printing jobs, the range of quality which may be expected, the ink consumption, and so forth. This kind of information can be learned without developing any facility in setting type or running a press.

Of course, if the school is conducting a program for both printing production technicians and administrative technicians, the same print-shop laboratory can be utilized by both groups. On the other hand, if the program has been developed only for administrative technicians, the equipment might be of such a nature that the instructors could operate it satisfactorily for demonstration purposes, or there perhaps may be a need for the assistance of one or two craftsmen as instructors' aides. Another possible alternative for this type of program is utilization of a local vocational-school print shop after that school's closing hours for regular day school. In addition, of course, there should be incorporated into the educational program, regular visitations and demonstrations in operating printing plants, paper mills, etc.

An example of one of the outstanding community-college programs for printing administrative technicians is the one offered by the New York City Community College of Applied Arts and Sciences. The record of success and achievement of its graduates in production departments of advertising agencies, and in printing plants, attests to the need of the graphic-arts industry for employes with this type of education and training. The curriculum was developed only after careful analyses of the industry's executive personnel needs in the metropolitan New York area. This program has made a significant contribution to graphic-arts education philosophy in demonstrating the comparatively minor equipment investment required for an effective printing administrative technician-education program. An outline of the curriculum and of the printing laboratory equipment follows.

CURRICULUM OUTLINE
ADVERTISING PRODUCTION MANAGEMENT

First Semester	*Hours Per Week*		
	Class	Lab.	Cr.
Fundamentals of Reproduction Processes	2	2	3
Graphic-Arts Photo Processes	1	3	2.5
Principles of Typography	2	2	3
Copy Preparation: Black and White	2	—	2
Typing	—	5	1
CAS Elective	3	—	3
Sociology	3	—	3
	13	12	17.5

Second Semester			
Format Analysis	1	2	2
Graphic-Arts Photo Processes: Line	1	3	2.5
Elementary Estimating	1	2	2
Copy Preparation: Color	2	—	2
Contemporary Art in Modern Society	2	—	2
CAS Elective	3	—	3
General College Mathematics	3	—	3
	13	7	16.5

Third Semester			
Color Reproduction Technology	2	4	4
Graphic-Arts Photo Processes: Halftone	1	3	2.5
Intermediate Estimating	1	2	2
Traffic Management	2	—	2
CAS Elective	3	—	3
Social Science Elective	3	—	3
	12	9	16.5

Fourth Semester			
Seminar in Advertising Production	2	2	3
Graphic-Arts Photo Processes: Color	1	3	2.5
Advanced Estimating	1	2	2
Production Management	2	4	4
Principles of Science	3	2	4
Social Science Elective	3	—	3
	12	13	18.5
Grand Total	50	41	69

NEW YORK CITY COMMUNITY COLLEGE OF APPLIED ARTS AND SCIENCES, GRAPHIC-ARTS AND ADVERTISING PRODUCTION DEPARTMENT
PRINTING LABORATORY EQUIPMENT

1 Kluge, hand-fed platen press, 10"x15"
1 Davidson dual offset press, 10"x16" w/letterpress attach.
3 Pilot presses, hand-operated, 6"x10"
1 Imposing stone, Hamilton, w/chase and galley racks, 51"
2 Galley racks, w/100 galleys
3 Ad frames, Hamilton w/48 cases double-tier
1 Showcard machine w/3 fonts of type in upper and lower case
6 Silk-screen units
1 Proof press w/brayer
1 Jacques paper and card cutter
1 Rouse miterer, hand
1 American lead and slug cutter
1 ATF process camera, 14"x17"
1 Circular screen, 120-line, Levy
2 Vacuum printing frames
1 Whirler, Brown & Co., 22"
2 Zarkin light tables, 55"
3 Graphic view cameras and lenses, 4x5
6 Speed Graphics
1 Ansco studio camera, 8x10
1 Deardorf camera, 8x10
6 Omega DII enlargers, 4x5
6 Contact printers, 5x7
3 Pako contact printers, 11x14
4 Salzman 1000W floods
2 Salzman 1000W spots
4 Salzman 500W spots
1 Salzman 2000W boom flood
1 Salzman 5x7 enlarger
1 Salzman 8x10 enlarger
15 Sinks, trays, processing tanks (temperature control)
1 Print dryer

Total Approximate Value—$25,660.00

Guidelines for Establishing Technician Programs

By Richard Lyons Burns

Assistant Professor, Division of Industrial Education,
Indiana State College, Terre Haute, Indiana

MANY states in our nation have and are turning to the area vocational-technical school as an agency in providing systematic vocational and technical education. An indication of the growing emphasis on this type of school is provided by the Vocational Education Act of 1963 in which at least one-third of the authorized funds are earmarked for area vocational schools or the post-high-school training of youths and adults.

Reported here in summary form are the chief findings, conclusions, and recommendations of a nationwide study of the factors involved in the successful establishment and operation of area vocational-technical schools and programs.* The information was gathered from a survey of 42 state directors of vocational education and 278 local directors of area vocational-technical schools and programs in 42 states. Although the area vocational-technical program has a different emphasis from state to state, as defined in this study, it usually refers to a post-secondary program which:

1. Frequently requires high-school graduation (or its equivalent) for entrance;
2. Is one to three years in length (full-time) but may offer part-time courses;
3. Emphasizes an understanding and an application of scientific as well as manual skills;
4. Is designed to provide specialized training for youth and adults and extension training for employed workers in the industrial, technical, agricultural, business, home economics, or medical technologies;
5. May offer courses for high-school or junior-college credit in certain vocational areas.

An "area vocational-technical school" refers to a school offering training to prospective students in a large geographic territory, usually involving five or more different occupational areas of training.

Factors Needing Consideration

Number of High-School Students.—A proposed area vocational-technical school or program should have a minimum of approximately 6,500 high-school students (14 to 18 years of age) in the geographic service area to assure the successful operation of a school or program. Student and adult interest in training opportunities, availability of jobs, and demand for workers may modify this situation somewhat as the study found 15 of the smaller, yet successfully operating, vocational-technical schools or programs to have approximately 2,000 high-school students in their service areas. The number of high-school students in a given geographic area would be more realistic than total population because the high-school age population in a given geographic area served by a vocational-technical school would vary depending on the age, economic, and social status of the total population in that geographic area.

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*Richard Lyons Burns, "Factors Governing the Establishment and Operation of Area Vocational-Technical Schools and Programs in the United States with Application to Missouri." Unpublished Doctoral dissertation, University of Missouri, Columbia, 1964.

Amount of Taxable Wealth.—The combined classes of taxable property in the area vocational-technical school districts displayed a median of $130,555,-556. Fourteen of the smaller, successfully operating, area vocational-technical schools or programs had approximately $10 million of taxable wealth in their districts.

Geographic Area in Square Miles.—On the basis of the data gathered, a geographic service area of approximately 48 miles in radius for a rural community, 34 miles for a suburban community, and 27 miles for a city, appear to be satisfactory for a vocational-technical school or program.

No effort was made in this study to investigate which, if any, of the proposed area vocational-technical schools or programs should be established as parts of junior colleges, comprehensive high schools, or as separate area vocational-technical schools. A decision on this matter would necessarily involve a consideration of conditions in the particular area, including the organizational structure of existing schools.

Employment Potential in the Various Areas.—The United States Bureau of Census classifies occupations into the following job families: (1) professional, technical, and kindred workers; (2) managerial, official, and proprietor; (3) clerical and kindred workers; (4) sales; (5) industrial, including craftsmen, foremen, and semiskilled operators, and unskilled workers; (6) service occupations; (7) farming. Area vocational schools commonly provide training for technicians, for some workers in the managerial, official, and proprietor group, sales workers, the various skilled crafts, some service occupations, and for some phases of farming and specialized occupations related to farming.

The Census Bureau does not indicate what portion of the professional and technical job family is composed of technicians. This will vary somewhat from one community to another, but it is known that the technician is the most rapidly expanding phase of this job family and should certainly be considered in the structuring of any area vocational-technical school or program. Findings of the investigation indicate that training in a minimum of three to six job families should be offered in establishing such schools. If a proposed area vocational-technical school or program is established to include one or more counties, the Census Bureau Report will yield the number of jobs available county by county in those job families.

In an area where there are a number of programs of vocational agriculture, or in any other field, in the local high schools, the area school program may be properly confined to other occupations or to specialized courses for adults over and beyond what is offered in the local schools. Generally, the area vocational-school program would include training for technicians, clerical and office workers, skilled craftsmen, certain of the service occupations, and specialized phases of agriculture such as farm machinery repair and service, nursery occupations, and so forth.

Extent of Voter Approval.—The state and local directors of vocational education cooperating in this investigation recommend that approximately 75 percent of the voters in the geographic service area approve the area vocational school or program prior to its establishment. A minimum of 61 percent approval was considered an absolute necessity. Expressions of voter approval should be secured before or in the process of establishing area vocational-technical schools. The procedure most often used to secure potential voter approval was that of securing school-board endorsement; however, the method most often recommended by directors of area vocational-technical programs was that of conducting a community survey.

Extent of Student Interest.—About 40 percent of the potential students in the geographic areas served by the area vocational schools should have an interest in a program of vocational training related to their chosen occupation. It is highly probable that area vocational-technical schools established in rural areas would easily find sufficient numbers of youth interested in taking advantage of the training. In addition to this would be those adults interested in the training to be offered. Directors of area vocational-technical programs indicated that studies of high-school student and adult interest within each area offered the most important guide for identifying potential students.

Extent of Industrial Support.—Over one-half of 273 area vocational directors indicated that advisory committee approval, industrial surveys, and school-board approval have been used to obtain industrial support for area vocational schools or programs. In an industrial survey, contacts are made with the various businesses and industries in the geographic area to ascertain whether or not employers and business leaders will support the area vocational school or program. The findings of this investigation indicate that no area vocational-technical school or program should be established until the support of roughly 75 percent of the industries of the area is assured. About 60 percent of industrial approval was thought to be a minimum for successful operation. No area vocational-technical schools should be established until appropriate measures have been taken to ascertain and perhaps promote industrial support.

Number and Types of Training Agencies.—Numerous types of agencies, such as private trade schools, public and private junior colleges, schools operated by industries, hospitals, and senior-high schools may already be training workers in a proposed vocational-technical school area. No effort was made in this study to secure data on existing training agencies in the proposed vocational-technical school areas, but the number of such training agencies, the occupations for which training is being provided, and the number of graduates from these agencies seeking employment in the area should be investigated as a part of the preliminary efforts to establish a school. In the process of establishing area vocational-technical schools or programs, a study should be made of the employment opportunities in the area and other areas to which the graduates of the school might go, as well as employer support, student interest, and voter approval. The mobility of trained workers from one geographic area to another should also be investigated as this will directly affect the number of training agencies in a given area.

Students checking industrial controls in the electronics technology course at Essex County Vocational-Technical School, New Jersey.

Type of Administration.—A workable administrative pattern for an area vocational-technical school or program would be one in which a qualified director of vocational education executes administrative policy. Over 60 percent of the local directors of vocational-technical school programs indicated that they administered the policies of the school under the general direction of some type of board, and that they favored this type of administration. This would suggest that a director should be appointed to have general administrative and supervisory responsibility for such schools or programs.

When a vocational-technical program is provided through a junior college, the administrative head of the junior college should have over-all administration of both academic and vocational-technical curriculums, and when the program operates as part of a comprehensive high school, the principal should have general supervision.

If an area vocational-technical school or program is to be established in conjunction with a junior college, it is advisable to integrate offerings and administration of the vocational program with that of the junior college. Training in a minimum of between three and six occupational areas should be offered in order to have a successful area vocational-technical school.

However, in all cases, a qualified director of vocational education should be employed to provide immediate supervision and direction of the vocational program.

Such a director should have adequate training and experience in vocational education as well as in supervision and administration to enable him to give the necessary leadership. The salary for such a position should be adequate to attract and hold competent people.

Ancillary Features.—To insure successful establishment and operation of an area vocational-technical school, every effort must be made to secure adequate physical facilities, including building equipment, proper working conditions, students genuinely interested in the training provided and who can profit by such training, and a qualified teaching staff. Over one-half of the 266 local directors cooperating in this study reported that the school or program operates much smoother where students have a clear concept of their goals and where there is no tension and friction between the academic and the technical members of the staff. In junior colleges, tension and friction were reduced when academic and technical subjects were taught in the same building; but in area vocational-technical schools, tension and friction were minimized when separate buildings were utilized for academic and technical training.

Experience has shown that one almost certain way to ruin a vocational program is to locate it in a rundown, discarded building, and to operate the school in such a way that it appears in the eyes of the public and students, as a dumping ground for academic misfits or problem children. Areas contemplating the establishment of vocational-technical schools should give these factors careful consideration.

The success of any school depends on the type and work of the teacher. Only those who know an occupation are competent to teach it. Therefore, occupational competency should be a first requisite in choosing a staff for a vocational-technical school. Areas contemplating the establishment of such schools should make certain that qualified teachers can be secured or retained.

Technical and Vocational Education within the Community College:

The Problems and How to Solve Them

By Maurice F. Seay

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IN considering the role of the public community college in relation to the manpower and educational problems of our times, one issue is clear: To meet the needs of the local community, the states, and the nation, the semiprofessional and technical curriculums should be increased greatly. If these curriculums are not increased in the public community colleges, then they must be established in an institution that can perform the functions of a comprehensive junior college.

To accomplish the needed increase in semiprofessional and technical curriculums, there are several serious difficulties that must be overcome. High on this list of difficulties is the need to build an adequate guidance program.

The open-door policy of a community college demands effective guidance. Effective guidance, in turn, demands a multiple purpose program with different curriculums. To serve as the "directive agency" both within the college and to the vast program in other types of agencies, and to have a base for coordination and planning, effective guidance also demands understanding of the total program beyond the high school.

In an effort to aid community colleges in establishing effective guidance programs, the Carnegie Corporation has presented a grant to the American Association of Junior Colleges. This grant is making possible an extensive study of counseling and guidance in American community colleges.

Compatibility—Does It Exist?

Another task that must be accomplished to achieve the increase in semiprofessional and technical curriculums is to make compatible in one institution all the local, state, regional, and national interests in education. This will be a complex and intricate task, but it is possible as a few significant points will indicate.

All governmental levels are interested in training for democratic living and participation. Since Sputnik, national interests have been greatly recognized and emphasized. Stimulated by federal aid to specific types of programs and by other forces, the national interests are being satisfied to some extent in community colleges.

For example, there is a national interest in the training of technicians for work in outer-space programs such as the one at Cape Kennedy, Florida. This interest is being satisfied by the training of such technicians in many community colleges throughout America. Re-

A student tests a poly phase meter in the electrical technology department at North Dakota State School of Science, Wahpeton.

duction of unemployment is another national concern which community colleges are helping to alleviate. One example is that of Kellogg Community College in Battle Creek, Michigan, where all students recruited from unemployed youth and trained in a technical curriculum were assured of employment before their course was completed.

Regional interests in education (those common interests of a group of states), such as the training of associate foresters and assistant conservation officers for regional park systems, forest preserves, and recreation areas, are being satisfied without the establishment of regional institutions. Community colleges have taken over the job by providing training programs which fulfill such regional requirements.

One of many examples illustrating the satisfaction of state interests in education through local community colleges is that of the Lansing, Michigan, Community College. With Kellogg Foundation support, Lansing Community College offers two special curriculums for the training of technicians who will be employed by the Michigan Highway Department and by the State Conservation Department.

An example of the fulfillment of a local need may also be given. In Battle Creek, there was a unique need for technicians in the cereal industry. Kellogg Community College has satisfied that need in part by offering a cereal industry technician's program.

A single institution such as the community college in Battle Creek, or a combination of such institutions, can offer a variety of curriculums which meet the needs of various geographic units or levels, thus making compatible under our present educational organization, the educational interests of the different governmental levels.

Must Build Prestige

Another task to be accomplished is that of according semiprofessional and technical curriculums a prestige similar to that now accorded the college transfer program. This need is revealed by the fact that about two-thirds of the freshman classes in community colleges take the college transfer program, while only 33 percent actually transfer to four-year institutions. It appears obvious that many of these students should be guided into other curriculums. From the testimony of many college administrators and counselors, we learn that the lack of prestige given the vocationally oriented curriculums is a major factor making it difficult to recruit students for any curriculum other than the college transfer one. That there are methods to correct this condition can be pointed out by means of a few pertinent examples.

According to proposals received by the Kellogg Foundation, many community colleges are using *ad hoc* committees to assist colleges in the planning and conducting of semiprofessional and technical curriculums. These committees consist of leading industrialists and professional men of the community along with the faculty and administrators from the college. Various prizes and citations are given by professional and industrial groups to outstanding students who take vocationally oriented curriculums. The presentation of these recognitions is made into a big community affair.

One example of a favorable situation is in St. Joseph, Michigan, where Whirlpool Corporation aided in the building of a beautiful structure for the semiprofessional curriculums in that city's community college.

The sympathetic understanding and backing of the chief administrative officers and the board are also effective ways of gaining prestige. When the student body and the public are made aware that these officials consider vocationally oriented programs important and academically acceptable, this feeling of importance is more likely to be accepted by students and their parents.

Because of the importance of the college administrator in building a multiple-purpose program, the Kellogg Foundation is supporting 10 university centers designed to train administrators for these colleges—administrators who do understand the nature of comprehensive institutions and who do have respect for the semiprofessional curriculum.

The inclusion of liberal arts education in vocationally oriented curriculums or the recognition of a core program in general education, taken by all students irrespective of their curriculums, also tends to break down the status symbol of the transfer program. Such practice is in accord with good educational theory. It means that our technicians and semiprofessional people have an understanding of the world, of our society, and can assume leadership responsibility in the community and can direct their own continuing education and recreation programs.

The attitude of the faculty must be stressed in this prestige problem. If a clear-cut distinction is made between the faculty for one curriculum and that of another and if the usual value system operates, those who teach liberal arts and who take courses in liberal arts will have the high prestige.

The accomplishment of the true function of a community college may require the adjustment of the value systems typical of college faculty members. Those professors who have intense research interests, who do not actually have a great interest in young people, who over-glorify the liberal arts, simply should not be teaching in a comprehensive community college. Boards of control and administrators can control this matter if they will be forceful in their recruitment, employment, and promotion practices.

Teachers—More and Better Trained

One of the most important tasks in accomplishing needed increase in semiprofessional and technical curriculums is that of recruiting qualified teachers. The scarcity of qualified teachers is particularly true with respect to teachers for these vocationally oriented curriculums. It is clear that for many community colleges part-time teachers secured from industry and the professions are necessary. In such a case, the problem is one of making a successful teacher out of a successful professional man through inservice education. Faculty members, in addition to knowing the content and skills for a vocation or profession, need to know something about the laws of learning derived from basic psychological studies, about the use of new instructional materials and communications media, about such things as programed learning and audiovisual aids. A few community colleges describe in their proposals to the Kellogg Foundation plans for experimental projects in the preparation of teachers for community colleges—preservice and inservice.

Perhaps the universities of this country are delinquent in not attempting to train teachers for these specialized curriculums. Here and there, there is some real interest, and I am told that some foundation aid is likely to be given in the near future for projects of this type.

Obsolescence?

Another difficulty which must be considered is that of relating the preservice training to a continuing program of education on the job. Most colleges that have present programs to train technicians do recognize how important it is to plan each curriculum as though the student will continue to study throughout life. The fact that the skills and content taught today often become obsolete next year, means we must rely upon self-directed and selfmotivated learning. We must teach students the art of how to keep on learning.

One way in which many of these colleges are meeting this problem is by organizing continuing education programs for their alumni and for other citizens of the community which they serve. They are cooperating with labor unions, with professional associations, and with universities.

Is the Cost Justified?

Still another task to be accomplished is to justify or reduce the high cost of specialized and technical programs. Programs of this type do cost more than the typical college transfer curriculum. Depending on the amount of laboratory work, they may cost *much* more. Attention is called, however, to the fact that real savings are made. For example, a dental hygienist whose education in a community college might cost $3,000 (two years) will be doing the work frequently performed by a dentist whose education cost $12,000 (four years).

Sometimes the cost is reduced by offering a "core program" within certain subject-matter divisions, thus increasing the size of classes. For example, students from nursing, dental hygiene, X-ray technicians, and from other health fields take all of their science courses together and thus greatly reduce the cost of this phase of their training.

Another plan for reducing the cost is to make arrangements for using equipment in industrial and professional offices for laboratory work. Also frequently an industry or a professional group, very much interested in securing this middle-level type of employe, will provide the funds for the needed laboratory at the college.

Is There Adequate Planning and Licensure?

Finally, the tasks of meeting licensure provisions and carrying out the necessary planning for such curriculums must be mentioned. State laws vary considerably with respect to legislative requirements for many of these semiprofessional occupations. The facts with respect to such requirements must be known, and individual colleges must work closely with officials from government and from professional associations which sometimes have licensure responsibilities.

To carry out the necessary planning for curriculums, the chief administrator of the college can assist leaders if he has been properly trained and has a favorable attitude toward a technical program. Another valuable source of assistance in planning are *ad hoc* committees comprised of faculty members and industrial and professional leaders.

Thus it can be seen that there are some serious problems in connection with the inauguration of technical programs. I hope, however, that negativism has been avoided by the listing of the illustrations indicating how these problems can and are being solved throughout the country. The results justify the efforts!

New Developments in Technical and Vocational Education in Canada

By C. Ross Ford

Director, Technical and Vocational Training Branch, Department of Labour, Ottawa, Canada

TECHNICAL and vocational education has been placed under provincial jurisdiction by the Canadian Constitution and no legislative prerogative of the provinces has been more jealously guarded. As a result, in the field of occupational preparation at all levels, a variety of organizational and administrative structures and educational services have been developed. However, there are many points of similarity among provincial programs and they are becoming more similar year by year.

In many respects, the Canadian programs in technical and vocational education are similar to those of the United States. This is to be expected for industry, employment opportunities, and general education are similar and professional and educational credits are readily transferable between the two countries. In some respects elements of the Canadian program may lag behind developments in the United States, for they are a blend of many influences. The influence of European contacts, different political and geographical environments, plus ingredients from hardy individualists are producing what I shall identify as the Canadian programs of technical and vocational education.

Canada does not have a federal office which is a counterpart of the U. S. Office of Education. The Technical and Vocational Training Branch of the Department of Labour is the agency of the federal government which assumes direct responsibility with respect to the development, financing, and coordinating of the federal government's interest in the technical and vocational-training services which are provided under provincial jurisdiction.

Each of the provinces has established a branch or division of technical and vocational education as a unit of the provincial department of education. In most provinces, the department of education provides for and administers the greater portion of the training programs although, in a number of instances, programs relating to a particular field—for example, agriculture—are frequently administered by that department. The same is also true with respect to fisheries or forestry, although the trend is more and more for training services to be centered in the department of education.

Federal Authorization

The authority for the federal government to participate in and provide financial assistance to the provinces on behalf of their technical and vocational programs is the Technical and Vocational Training

Assistance Act of 1960. This Act identifies the program areas and the manner in which the federal government may participate in this total program. This is the fifth piece of federal legislation relating to technical and vocational education which has been on the Canadian statute books. The first was in 1913 and each time that a change has been made the existing legislation has been repealed by the enactment of the new legislation. This has made it possible to plan a program around new concepts to meet changing conditions.

The Technical and Vocational Training Assistance Act defines the program of technical and vocational training as being any form of instruction the purpose of which is to prepare a person for entry into gainful employment in any primary or secondary industry or service occupation, or to increase his skill or proficiency therein and, without restricting the generality of this statement, it includes the occupations of agriculture, fishing, forestry, mining, construction, manufacturing, transportation or communications, and any other primary or secondary industry or service occupation requiring an understanding of the principles of science and technology, except where such instruction is designed for university or transfer credit.

The Technical and Vocational Training Assistance Act is implemented by way of two federal-provincial agreements: (1) The basic agreement, The Technical and Vocational Training 'Agreement, (2) The Apprenticeship Agreement. These agreements outline, in considerable detail, the kinds of services for which federal reimbursement is provided. They specify the rate or the amount of federal contributions and they have tended to give direction to the total program that is developing in Canada.

Different Financing than the U.S.

Thus the manner of implementing federal aid differs from the state plan requirement in the U.S. Our financial people tell us the control devices must be different when the federal financial support is open ended and not limited by a quota. Since this federal financial contribution is a reimbursement of at least 50 percent of total provincial expenditures on approved programs, and since the rate of reimbursement varies between 50 and 100 percent—the Federal Provincial Agreements are in considerable detail. The agreements of which I speak consist of three parts:

1. The agreement proper—identifying the programs of training reimbursable and the rate of federal contribution.
2. An appendix identifying in detail the items which are shareable and items requiring prior federal approval.
3. The regulations under which programs may operate such as purpose, eligibility, selection, program operation, etc.

When agreements are drafted, provincial and federal officials cooperate to develop mutually agreeable regulations which will stimulate and support the training services which are required.

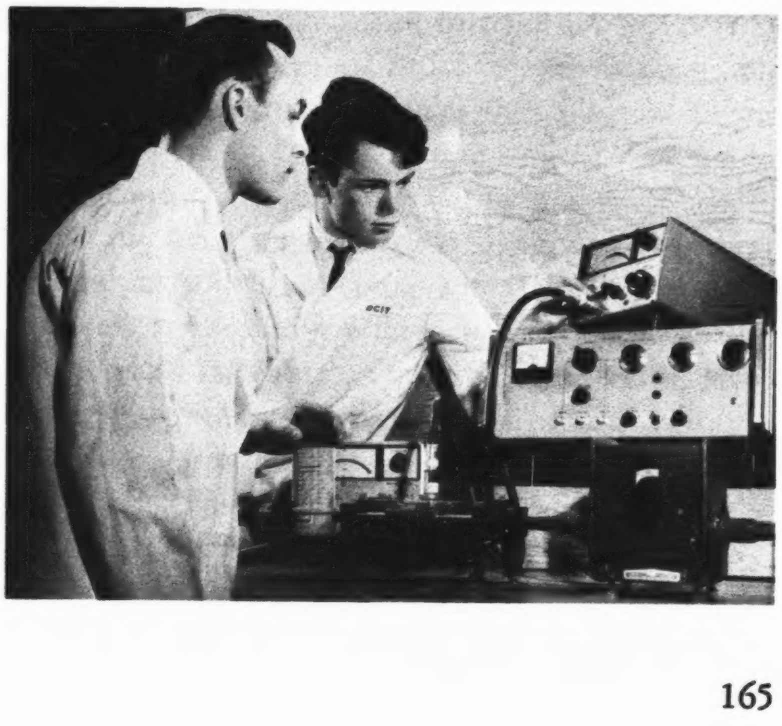
We frequently wish we had required each province to develop a provincial long-term plan. Such a device would stimulate careful planning and, perhaps more important, it would reduce the total amount of paper work.

Technician Training Has Doubled

The section of the legislation which has given the most dramatic impetus to the development of new technical and vocational facilities and programs and, in fact, which has changed the emphasis in education in Canada, is the capital expenditures program. Federal reimbursement covers 75 percent of the costs of equipping and construction of approved facilities. Under this legislation, the post-high-school training of technicians has more than doubled.

For the training of technicians, the federal government reimburses the provinces for 50 percent of provincial government expenditures on approved training

Students in electrical and electronics technology at British Columbia Institute of Technology, Burnaby, operating a microwave circuit.



programs without limit, with the exception that for the retraining of unemployed persons, the federal contribution is 75 percent of operational costs and 90 percent of the training allowances provided for unemployed persons.

One of the most important features of this legislation is that, subject to the approval of parliament, the federal government will reimburse the provinces at the rates indicated for approved programs without limit.

In discussing technical education, I shall deal principally with those post-high-school programs which provide training for the variously described group called technicians.

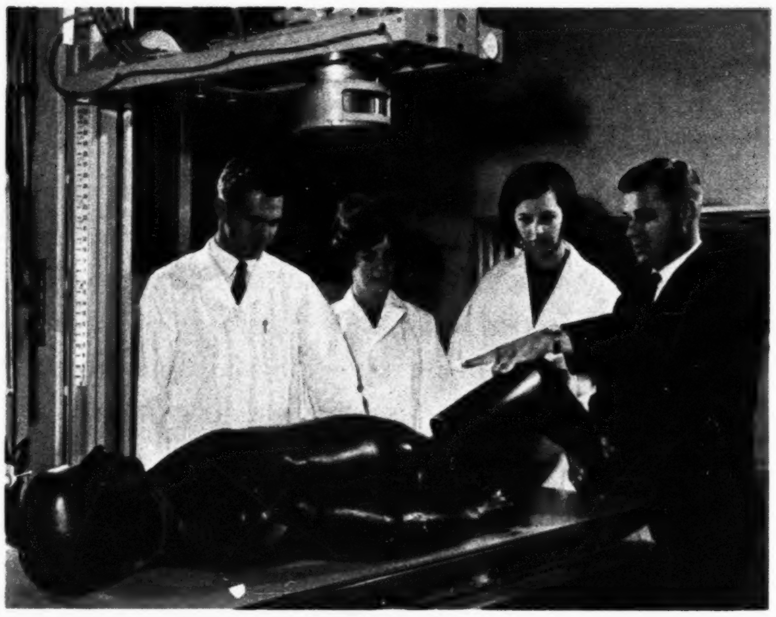
Post-high-school training at this level has been a somewhat recent development. Practically all of the facilities and programs in Canada have been developed since World War II. At the present time, programs at this level are found in every province of Canada except one. Thirty-seven institutions of varying size provide instruction in a very broad spectrum of occupations to something in excess of 18,000 students in full-time classes. Since many of these programs extend over a three-year period, the number of graduates per annum is slightly less than 4,000 at the present time, but we know with considerable certainty that this number must be doubled or tripled before the end of this decade.

Differences Between the U.S. and Canada

In the post-high-school technical programs some rather important differences are to be noted between the developments which have taken place in Canada and those in the United States.

In the first place, the training is provided at institutions called institutes of technology. With one exception, none of the programs are provided by a university, junior college, or community college, or for transfer credit. The institutes of technology are *all* administered by provincial governments. There are no proprietary or endowed schools or institutes providing training at the post-high-school technological level in Canada. The programs in institutes of technology cover a very broad range of occupational fields including all of the engineering, agriculture, fishing, forestry, mining, medical and health services; business subjects and other new areas are being added each year.

The problem of developing standards in this program has been given considerable attention. The institutes are spread across a narrow band north of the 49th parallel reaching 4,000 miles from east to west, and cater to a very mobile population.


These medical radiography technology students at British Columbia Institute of Technology position a "patient" on an X-ray machine.

To coordinate nationally the manpower development and training programs, or the total technical and vocational training programs in Canada, a National Technical and Vocational Training Advisory Council is appointed by the federal government. This Council meets twice a year and advises the federal government on matters pertaining to technological education. This Council had a subcommittee appointed on technological education to provide coordination and give leadership, direction, and guidance in developing standards for the post-high-school technological programs.

This advisory committee is representative of industries, government, labor, and professional societies concerned with the technician graduates. Through their activities and in cooperation with the administrators of the schools, a number of criterions have been developed for these programs.

It has been agreed that:

1. Entrance qualifications to the post-high-school institute of technology shall be high-school graduation with three years of advanced training in mathematics and science.

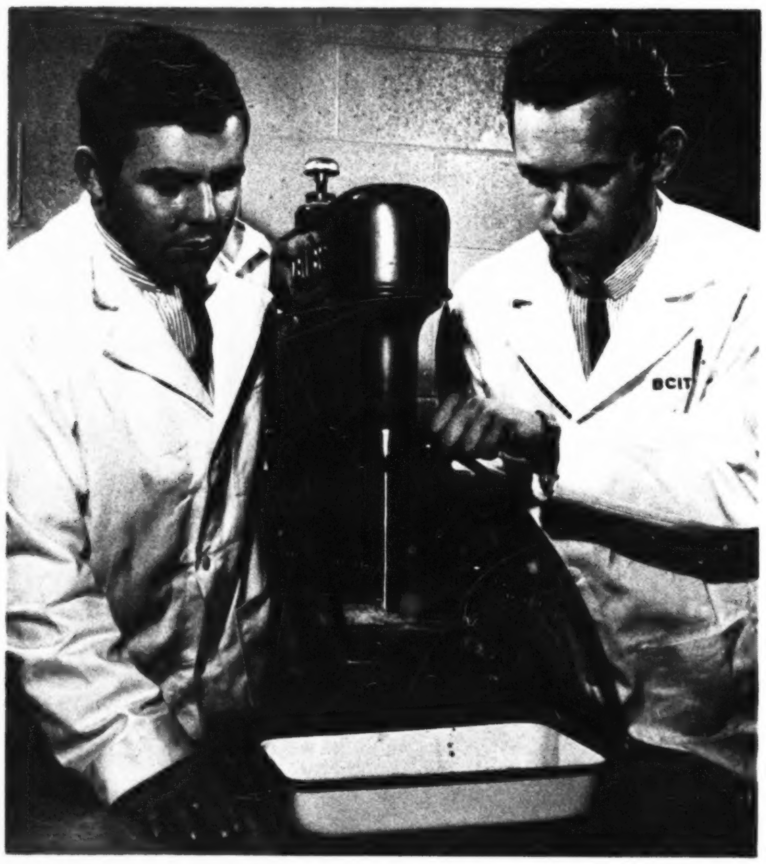
2. The contact hours of training shall be approximately 2,400 for each program.

3. A curriculum pattern similar to that proposed by the ILO and UNESCO has been recommended by the technological advisory committee. This identifies

the educational criterions by which the standards of the institutes can be identified. The criterions are:

a) *Related General Education Courses,* such as grammar and composition, report writing, industrial organization, and human relations;	10 to 15 percent of total contact time
b) *Auxiliary and Supporting Technical Courses,* such as drafting, work-study, data processing, and related skills training; (Note: Some subject areas designated in this category may, of course, be among the technical specialties for some technologies.)	15 to 20 percent of total contact time
c) *Mathematics and Basic Science Courses,* such as algebra, trigonometry, analytic geometry, calculus, organic chemistry, heat, light, sound, general geology, general biology, probability theory, and statistics;	10 to 30 percent of total contact time
d) *Technical Specialty Courses,* including (1) basic medical, engineering, fishery, forestry, sciences, etc., such as fluid mechanics, heat transfer, electric and electronic circuits, physical metallurgy, graphical statics, kinematics of machines, and (2) more advanced courses in the technologies such as plant life, elements of structures, tool design, control systems, refrigeration, reforestation, heat engines, unit operations, and fish processing.	35 to 60 percent of total contact time

Mining technology students use a flotation machine to separate minerals from waste rock.



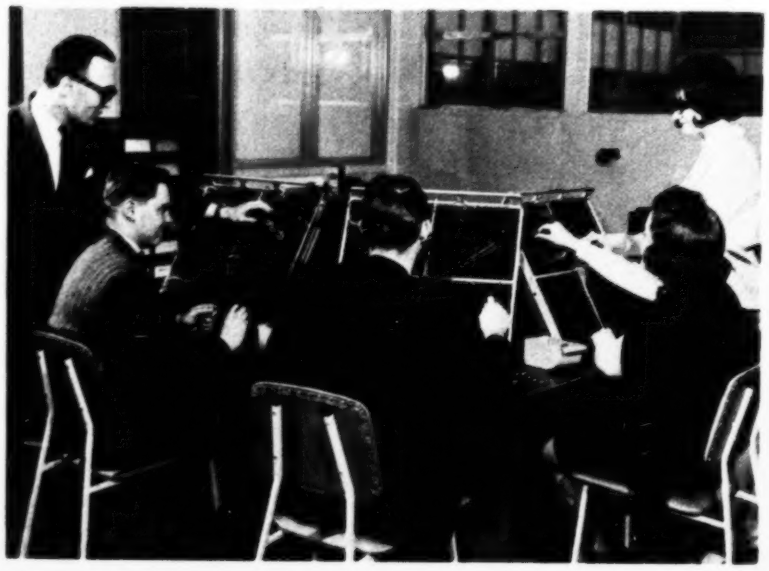
In addition to these criterions, others are in the throes of being identified. These will include teaching loads, teacher qualification, facilities and laboratory equipment, and a more precise identification of the specifications of the programs of studies in each technology which will be used in the institutes of technology.

Controversy over Identification

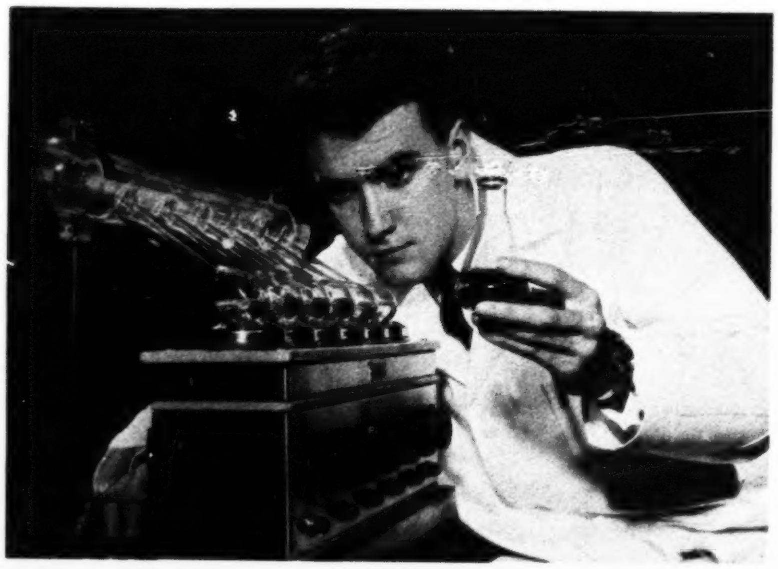
There has been continuing controversy in Canada as to the correct manner of identifying the qualifications of the graduates of technician programs. The suggestion has been made that they be classified as Technicians Grade 1, 2, or 3, and for those who complete the 2,400-hour program, they would be identified as technologists. This classification has not found favor outside of one or two provinces.

In the Province of Quebec, a chartered provincial organization identifies the graduates of the program in that province as certified technicians on the completion of the school training program, and after 10 years' experience in the field they are classified as professional technicians and legally write the initials P.T. after their name.

The proposal which has been made recently is that the academic qualification which is attained on the completion of the 2,400-hour program be identified by a specific name. The name which has been selected and accepted by the administrators of the technological programs is the "Diploma of Technology" in the engineering field, and the "Diploma of Applied Arts" in all other two-year or 2,400-hour programs.



Business technology: Using computer machine boards.



Food processing technology: Analyzing for protein.

In addition to full-time day classes leading to the Diploma of Technology, a program of advanced technical evening classes is offered in Ontario by which the Diploma of Technology may be obtained by following a carefully outlined program over several years. Sandwich-type programs have not as yet been developed but are being studied, and it is expected they will shortly become a part of the Canadian program.

Analyses Being Made

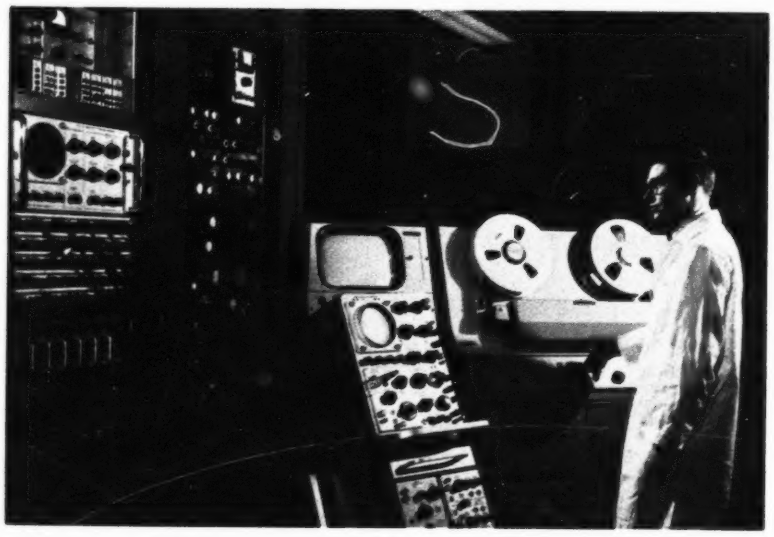
In addition to the services which are being provided in the field, the Technical and Vocational Training Branch of the federal Department of Labour has established a Technical Services Division which has undertaken to make such analyses of the occupational fields where technicians may be employed as are necessary to further identify and improve the standards of the programs in relation to the requirements of the labor market.

It might be of some interest to note the particular types of analyses which have been undertaken. For example, in an industry such as the fishing industry, complete analyses have been made of all work functions. For want of any better name this has been called the functional structure of industry. In this type of analysis, the four general levels of occupational competence which are generally identified in the labor force show up very clearly. Identified were those functions which are performed by the operator, those performed by the skilled craftsman or the skilled worker in his field, those that would be performed by the technician, and those services which are provided by professionally trained persons.

This type of analysis is being made in a number of occupational fields with a view to identifying as clearly as possible their requirements for technical occupations, as well as the relationship which exists between the different occupational levels.

Medical laboratory technology: Antibody investigation.

Broadcast technology: Operating video-tape recorder.



Occupational Analysis for Technical Education

By Maurice W. Roney

Director, School of Industrial Education,
Oklahoma State University,
Stillwater, Oklahoma

ALL occupational training is based on an interpretation of the factors that make for success in the occupation. This is true for any instructional program, whether it be a short course designed to update specialists in a highly technical area, or a broad comprehensive professional program covering a period of several years. It is the responsibility of professional educators to plan and organize instructional services that are effective and efficient in preparing individuals for productive work in society; to do this, they must have occupational information.

Manual dexterity is an absolute requirement for success as a watchmaker or as a brain surgeon. Consistent accuracy is required for the mathematician and for the professional basketball player. But each of these occupations requires a preparation entirely different from the others. In general, it can be said that the briefer and more intense the program of instruction the more a tightly structured occupational analysis is required. There is less margin for error, for example, in selecting the content of a six-week course in servomechanisms than in the design of a four-year baccalaureate degree program. The latter will contain much generalized information that has many applications.

Technician occupations present real problems for the analyst whose aim is to obtain information for educational planning. The work of a technician normally involves decision making—a process that cannot be quantified. Decision making requires value judgments, as contrasted with the skills involved in production, maintenance, service, and repair functions that are largely prescribed. A field service technician employed by a petroleum products company may be called on to determine the cause of a breakdown in an expensive diesel engine. He may trace the cause of the trouble to a lubrication problem which, in turn, may reveal a hydraulic, heat transfer, or chemical problem. We might conclude from this example that the training program for technicians in this field should include elements of hydraulics, principles of heat, and chemistry. But the technician in this situation must also be familiar with engines, engine accessories, and fuels and lubricants.

The problem facing the curriculum designer is: how much of the instruction should be specialized in the area of power mechanics, and how much should be generalized through course work in mathematics and the physical sciences? *The answers to these questions do not lie in more and better occupational analysis.* Instead, they are questions of educational processes.

Analysis May Be Futile

A complete analysis of a "technician occupation" would be a formidable, if not an impossible, task. Even if such an analysis could be completed, the exponential rate of change in modern technology would render the results obsolete almost immediately. Curriculum changes require time. Add to this the inescapable time lag of the training period (two years for the technical training program as we view it today), and it becomes obvious that occupational analysis in the form of a detailed description of the job functions is impractical.

If one accepts the most common definition of the technician as an intermediary between the engineer and the craftsman, the technician is in a position of great vulnerability with regard to change. Indeed, the great changes in technology must inevitably invade the domain of the technician; he is the catalyst who makes change possible. All of which points to the utter futility of an analysis of technician occupations based on job functions.

This is not to suggest that research in the area of job requirements is not needed. It does suggest, however, that many of the studies and surveys in this area may have been misdirected.

Some of the early studies of technician occupations failed to reveal any consistent patterns useful for educational planning—studies of the technician's need for mathematics, for example. Practicing technicians, it was concluded, did not use mathematics to any great extent in their work; therefore, mathematics could be treated as supplementary rather than basic in the instructional program. The fallacy of this conclusion is now comparatively well known. What is not so well known is how much mathematics is needed in the learning process and what kind of mathematics instruction is most effective in the instructional program. No amount of occupational analysis will provide answers to these questions. They are largely educational in nature; little has been documented as to the unique requirements for mathematics in the technical education program.

The New May Be Old

The expansion in technology has seemingly complicated the problem of technical curriculum design. New techniques, new materials, and new processes appear daily. It is questionable, however, whether *new principles* have proliferated to the same extent. It is true, of course, that in certain technologies, such as electronics, the development and use of solid-state devices has actually created new circuit parameters. In general though, and in most technologies, new developments are, in fact, new combinations of known principles. Occupational study can be useful in analyzing these new developments and updating instructional programs through the use of the newer applications in the teaching of basic principles. If this is to be done it will be necessary to eliminate outdated instructional methods and improve teaching efficiency. Adding new material without discarding the outdated is seldom justified; in most cases it is not possible within the time limits of the program.

We are somewhat like the farmer who rejected the agricultural extension agent's proffered assistance by saying that he needed no new ideas because he already knew how to farm much better than he was farming. We already have more information than we can effectively include in most two-year programs without improved instructional processes.

If occupational research is to be useful in improving instruction, the research should be directed toward the knowledge elements of the technician job. It is not *what the technician does* that gives us an insight to his educational needs; it is *what he knows*. Every student of trade and job analysis has at some time dissected a job to identify the necessary skills and related information. But an analysis of a technical occupation starts at a different point. We are primarily concerned with the technician's need for information and secondly with the ways in which he may use this knowledge—the applications.

Returning for a moment to the trade and job analysis, the second step in this process is to develop instructional material, utilizing the "do and know" of the original analysis. But the technician, as before stated, may "do" many things, based on his knowledge of technical principles. It is obvious then that the central elements of a technical program must be the knowledge elements that are common to a great many jobs in the technology under consideration.

Evidence of the validity of the job-cluster concept can be found in a study of the graduate placement patterns of any established technical school. It is not uncommon for a graduate of a good electronics technology program to have five or six job opportunities in as many parts of the country. Thirty such graduates from a single program literally may be employed in thirty different jobs.

How Can Programs Be Planned?

If neither the traditional job analysis nor the more sophisticated function analysis methods are usable, where are the handholds for technical program planning? It is obvious that certain common technical skills exist in each field of technology. Where these common elements can be identified, what instructional processes are most effective in integrating them in a technical education program? *These questions are largely unanswered in terms of documented research.* Unquestionably, good technical programs are in operation and the administrators of such programs have answered these questions to their own satisfaction. But the number of technical education specialists with administrative experience in established and successful schools is pathetically small. There is a critical need for both research and professional leadership development that will give direction to the technical education movement.

Although technical instruction is principle-based, applications of these principles are indispensible in the teaching-learning process. Every good teacher uses applications wherever possible to illustrate principles and to motivate learning. Occupational research in this vein could be of real value to the technical teacher if specific examples of technical skills could be identified and documented. Research of this nature probably can be done only by experienced technical-education specialists. It is doubtful if one not familiar with technical teaching could make analyses of this type, regardless of his technical competence in the specialized field under study.

Research in occupational analysis may be one answer to the technical teacher's problem of obsolescence. Perhaps it is not unrealistic to expect that schools will, at some time in the future, be able to build this kind of activity into programs of teacher improvement along with summer institutes, advanced professional training, and the like.

More Sophistication Needed

Laboratory equipment for technical courses must be continually updated. Teaching aids produced for commercial sale usually simplify principles; at best they provide only a limited concept of the applications of principles. Many and varied applications are needed to make technical principles meaningful and to illustrate variations, degrees of precision, economic considerations, accuracy limits, interrelationship of principles, and many other factors involving judgment and decision making—the stock in trade of the technician.

Occupational analysis can produce results. But the kind of analysis required is much more sophisticated than that of the past. It must focus on the knowledge elements of the occupation, not the day-to-day job functions. If it is to be useful, it must be done by experienced technical education personnel. Finally, the resulting information must have the effect of reducing rather than adding to the time required in formal training for the technician. Curriculum planners must be willing to replace outdated educational material and processes with new materials and processes if occupational analysis is to have the desired results of improving instruction.

Section 9

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Professional Organizations Concerned with Technician Education

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The American Association of Junior Colleges

THE American Association of Junior Colleges was established at a meeting at St. Louis, Missouri, in 1920. George F. Zook, specialist in higher education at the United States Bureau of Education (as it was then called), gathered together 34 representatives from 22 of the 207 junior colleges existing at that time to define the junior college by creating standards and criterions, to determine its position structurally in relation to other parts of the school system, and to make a contribution to the work of education.

Today there are 771 junior and community colleges, approximately 600 of which are members of the American Association of Junior Colleges. Junior colleges enrol 1,150,000 and more students, and both the number and enrolments of junior colleges are increasing at a fast pace. The AAJC constitution states: "The purpose of this organization shall be to stimulate the professional development of its members and to promote the growth of the junior colleges."

One of the ways that the American Association of Junior Colleges has made a genuine contribution to the work of education while promoting the growth of the junior college is in the area of technical education. Governmental and industrial leaders have repeatedly emphasized the growing and critical need for college-trained technician and semiprofessional personnel, and in many cases have pointed to junior colleges as a major resource for production of such personnel.

A significant effort in technical education development is represented by a national conference on technical education held in July of 1962, sponsored by the American Association of Junior Colleges. Conferees, representing junior colleges, government, and industry, recommended closer cooperation between industry and the colleges; stepped-up student recruitment; three-way communication among industry, universities, and junior colleges to insure proper preparation of teachers for technical education programs; and the development of high-school guidance programs that would recognize the technical education potential of junior colleges.

In May 1963, the Association cooperated with the University of Michigan in a technician manpower conference sponsored by President Kennedy's Office of Emergency Planning. At the conference, the Association was again active in planning how the junior college can contribute to the supply of trained technicians by providing quality technician programs.

A bulletin, *Technical Education in the Junior College,* written by Norman C. Harris, professor of technical education, Center for the Study of Higher Education, University of Michigan, has been published and is now available from AAJC. It is hoped that the bulletin will make a significant contribution to technical education by giving directions for the creation of appropriate programs of technical education in junior colleges. In addition to the publication of the bulletin, the AAJC is engaged in a continuing study of the needs in technical education and is outlining an action plan for improvements in the field.

Headquarters of the AAJC is at 1315 16th Street, N.W., Washington, D.C. 20036.

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National Council of Technical Schools

THE National Council of Technical Schools (NCTS) is a group of private independent technical schools offering terminal courses that prepare graduates for immediate gainful employment in positions supplementary to those of professional engineering, according to its official statement. Graduates are designated as "engineering technicians" to distinguish them from medical technicians, industrial technicians, etc.

The National Council of Technical Schools acts as an approval agency for proprietary schools offering courses in the semiprofessional engineering technical field. For a school to gain approval and admission, all conditions set forth in the Council's "Code of Minimum Standards of Practice for Technical Institutes" must be met.

The NCTS is comprised entirely of schools deriving their financial support from student tuition and/or endowments. Many member schools are chartered as nonprofit and none are supported from public tax funds.

The organization was formed in 1944 for the purpose of promoting sound educational, ethical, and business standards in the area of engineering technology education. A minimum of five years of continuous operation is required for admission to membership and every NCTS school must undergo reinspection of its courses each four years.

Headquarters are located at 1507 M Street, N.W., Washington, D.C. 20005.

American Technical Education Association, Inc.

By William N. Fenninger

Executive Secretary

THE American Association of Technical High Schools and Institutes, the forerunner of the American Technical Education Association, Inc., was organized at Cass Technical High School in Detroit in December 1928. Of the first three presidents, one was from Canada.

At the annual meeting in Miami, Florida, in December 1950, in the interest of simplicity and to indicate its broader scope, the name of the Association was changed from the American Association of Technical High Schools and Institutes to the American Technical Education Association.

In 1960 the Regents of the University of the State of New York granted an absolute charter to the American Technical Education Association. The Association is incorporated as a nonprofit educational corporation. Dues are deductible in filing income taxes. The following is taken from the charter: "The purposes for which such corporation is formed are: (*a*) To promote technical education for interested and qualified youth and adults; (*b*) To recommend standards for technical education; and (*c*) To provide an opportunity for an exchange of ideas among persons in the technical education field."

Newsletters.—With the establishment of the new post of executive secretary, which was part of the constitution adopted in Philadelphia in 1957, the Association began the publication of a newsletter. The first of these was issued on June 19, 1958. These *Newsletters* are issued eight times a year. They contain a digest of much of the current literature in the field of technical education, including new textbooks. They are designed to inform ATEA members of the most pertinent and significant events and developments in the field of technical education, both in schools and industry.

Services to Individual Members.—1. An international annual convention is held with outstanding speakers who discuss the problems of technical education and their solution. At least one of these speakers is always from Canada.

2. Copies of the ATEA convention addresses are sent to members.

3. The ATEA convention is held in the same city as, and just prior to, the American Vocational Association convention, so that one trip includes both conventions.

4. At least eight significant and informative newsletters are issued each year. These provide members with selected information which it is difficult, if not impossible, to obtain without membership.

5. From the great mass of literature on technical education, selected quality publications are sent to all members.

6. Members receive the annual report of the executive secretary and a certified financial statement of the Association.

7. Biennially, a membership directory is furnished to members.

8. The Association provides consulting services on a wide variety of problems involved in establishing, expanding, and improving technical education.

Institutional Member Service.—Institutional memberships for schools offering technical courses are available to public and private technical institutes, community and junior colleges, technical high schools, and vocational-technical schools. Institutional members receive the services listed above. In addition, they receive selected professional publications which are too expensive to send to individual members or of which the supply is too limited. For example, institutional members were sent a copy of the American Society of Engineering Education report, *Characteristics of Excellence in Engineering Technology Education.* Institutional members also receive copies of ATEA committee reports. A recent one was a progress report of the joint American Technical Education Association—National Association of Industrial Teacher Educators Committee on "The Selection and Education of Teachers of Technical Subjects."

Industrial Member Service.—Industrial membership is open to those companies which employ technicians or are interested in increasing the supply of well-trained technicians, including companies which publish texts for the training of technicians or which make equipment for the training of technicians. Each company which takes out an industrial membership may appoint a representative who is eligible to serve on a School-Industry Coordinating Committee. This Committee gives help to the schools in determining the number of technicians that should be trained for each occupational area and also assists in keeping instruction up-to-date so that technicians of the number and quality needed by industry may be trained.

Plans for Extended Service.—At a meeting of the Trustees in June 1963, it was decided to make a study similar to the one described in the ASEE report, *Characteristics of Excellence in Engineering Technology Education,* but for areas of technician education not included in the ASEE report. Preliminary plans are under way. The objective is to recommend studies for technician education not only in engineering-related occupations, but also in health, agriculture, and business.

In order that a larger number of teachers may participate in the work of ATEA, more regional conferences are being planned. Two New England Regional Conferences, a Western New York Conference, a Central Regional, and two Atlantic Regional Conferences have been held. Others are planned.

The American Technical Education Association, Inc., will play an increasing role in this field of education. It is one organization which assists in the development of programs designed to increase the supply of well-trained technicians at all levels, whether the training is given in high school or post-high school, whether given in public schools or private institutions. It fosters cooperation among all agencies offering quality programs in all occupational areas.

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Engineers' Council for Professional Development

THE Engineers' Council for Professional Development (ECPD) was founded in 1932 because of the need to improve engineering education and to encourage the development of a professional attitude among young engineers. This was to be accomplished through such activities as guidance, engineering schools, training, recognition, ethics, and information committees.

Participating bodies in the work of the ECPD are the American Institute of Aeronautics and Astronautics, Inc., American Institute of Chemical Engineers, American Institute of Industrial Engineers, Inc., American Institute of Mining, Metallurgical and Petroleum Engineers, American Society of Civil Engineers, American Society for Engineering Education, The American Society of Mechanical Engineers, The Engineering Institute of Canada, The Institute of Electrical and Electronics Engineers, Inc., and the National Council of State Boards of Engineering Examiners.

Since its founding, the Council has expanded its operations, one phase being the education of engineering technicians. It has an active Committee on Engineering Technology within its Education and Accreditation Committee.

Headquarters of the ECPD are at 345 East 47th St., New York, New York 10017, and Elsie Murray is executive secretary.

ECPD Accreditation Program for Curriculums Leading to First Degrees in Engineering Technology

Organizations and Objectives

In an effort to serve industry and the engineering profession generally by stimulating the development of a better balanced system of technical education, the Engineers' Council for Professional Development in 1944 appointed a Subcommittee on Technical Institutes within the Council's Education and Accreditation Committee. After several years of study, the subcommittee recommended and subsequently established a basis for accrediting programs of technical-institute type. (The subcommittee became a full standing Committee on Engineering Technology in October 1964.) Diversity, both of programs and of types of institutions that offer them, made it difficult but imperative to set some limit on the type of curriculums that would be considered. This was not done in an attempt to enforce unified standards which might tend to force these educational programs into stereotyped patterns. Instead, each curriculum is appraised in terms of quality and accredited in the light of its own purposes, content, and scope.

Instruction in the broad area of technical education that lies between professional engineering on one side and vocational education on the other is conducted by several types of institutions. Curriculums offered by schools in the following categories may be considered by the subcommittee: (1) technical institutes, endowed or publicly supported; (2) junior colleges offering terminal programs; (3) divisions of colleges and universities; (4) proprietary schools, operated by individuals or corporations.

Curriculums to be considered are technological in nature and lie in the post-high-school area. They differ in content and purpose from those of the vocational school on one hand and from those of the engineering college on the other. Curriculums in this field are offered by a variety of institutions and cover a considerable range as to duration and content of subject matter, but have in common the following purposes and characteristics:

1. The purpose is to prepare individuals for various technical positions or lines of activity encompassed within the field of engineering, but the scope of the programs is more limited than that required to prepare a person for a career as a professional engineer.
2. Programs of instruction are essentially technological in nature based on principles of science and include sufficient post-secondary-school mathematics to provide the tools to accomplish the technical objectives of the curriculums.
3. Emphasis is placed on the use of rational processes in the principal fundamental portions of the curriculums that fulfill the stated objectives and purposes.
4. Programs of instruction are briefer, and usually more completely technical in content, than professional curriculums, though they are concerned with the same general fields of industry and engineering. They normally lead to the appropriate Associate Degree. Graduates of such programs are commonly designated as Engineering Technicians.
5. Training for artisanship is not included within the scope of education of technical-institute type.

Definitions

1. *Engineering technology* is that part of the engineering field which requires the application of scientific and engineering knowledge and methods combined with technical skills in support of engineering activities; it lies in the occupational spectrum between the craftsman and the engineer at the end of the spectrum closest to the engineer.

2. An *engineering technician* is one whose education and experience qualify him to work in those areas of engineering which require the application of established scientific and engineering knowledge and methods, combined with technical skills, in the support of engineering or scientific activities toward the accomplishment of engineering objectives.

3. An *engineering technology curriculum* is a planned sequence of college-level courses, usually leading to an Associate Degree, designed to prepare students to work in the field of engineering technology.

General Policies

In view of the diversification of engineering technology curriculums, the types of institutions that offer them, and the undesirability of enforced uniformity, each program or curriculum falling within the boundaries stated below will be recognized in terms of its own purposes, scope, duration, and content. Published lists of such accredited programs, or curriculums, will indicate the name of the curriculum and the institution offering it.

Accredited curriculums shall satisfy the following requirements:

1. *Duration.* Not less than two academic years of full-time residence work beyond the secondary school or the equivalent in part-time work.
2. *Requirements for Admission.* High-school graduation or the equivalent. A high-school transcript indicating graduation or certification of equivalency must be available for all students.
3. *Curriculums.* Technological in nature, employing the application of physical science and the techniques of mathematics to the solution of practical problems, and comprising a prescribed sequence of related courses in a specific field, though not excluding a reasonable amount of elective subject matter.
4. *Instruction.* By accepted class and laboratory methods. Laboratory work shall comprise an important part of each curriculum.
5. *Teaching Staff.* Qualified as to educational training and experience and sufficient in numbers to provide adequate attention to each student.
6. *Educational Institution.* An organized school or a division of an institution devoted to the specific aim of providing technical institute programs; a stable organization having adequate financial support and demonstrated capacity and achievement in the engineering technology field.

   The school shall maintain a high standard of ethics in its educational program and in all its dealings with students and prospective students. In its correspondence, published materials, and other public announcements, the statements used shall be frank and factual and shall not be misleading.
7. *Physical Facilities.* Adequate for the purposes of the curriculums offered.

Accrediting Principles and Procedures

Effective October 31, 1965, the Committee on Engineering Technology of ECPD will consider for accreditation only curriculums offered in an institution of higher learning that is accredited by the regional accrediting association, unless the regional accrediting association does not make provisions for the accreditation of specialized institutions. The Committee on Engineering Technology will continue to accredit engineering technology curriculums directly in institutions which because of organizational structure are not eligible for accreditation by the regional association.

Accrediting is conducted in accordance with the following principles and procedures:

1. Individual curriculums are accredited. Separate examinations are conducted for curriculums offered in the evening or in geographically separated branches of an institution. In addition, cooperative programs are examined as independent curriculums.

2. Rigid standards as a basis for accrediting are avoided in order to prevent imposed uniformity and to encourage educational experimentation.

3. Curriculums are appraised on invitation of the institution offering them.

4. Curriculums are accredited on the basis of both qualitative and quantitative criterions which are evaluated through visits by a committee or committees representing Engineers' Council for Professional Development and through data secured from catalogs, other publications, and questionnaires.

5. Qualitative and quantitative criterions include the following:

   (*a*) Qualifications and experience of members of the faculty as well as the ratio of numbers of faculty to the numbers of students taught.
   (*b*) Standard and quality of instruction: (1) in technical courses, (2) in basic scientific and other required courses.
   (*c*) Scholastic work of students.
   (*d*) Records of graduates in industry.
   (*e*) Auspices, control, and organization of the institution and of its engineering technology division.
   (*f*) Curriculums offered and form of certificate or diploma offered.
   (*g*) Age of the institution and of the individual curriculums.
   (*h*) Basis of and requirements for admission of students.
   (*i*) Number of students enrolled: (1) in the institution as a whole and its technical institute division; (2) in the individual curriculums.
   (*j*) Graduation requirements.
   (*k*) Teaching staff and teaching loads.
   (*l*) Physical facilities devoted to technical institute curriculums.
   (*m*) Finances: investments, expenditures, sources of income.

6. Information supplied by the institution is for confidential use of Engineers' Council for Professional Development and will not be disclosed without the written authorization of the institution concerned.

7. Findings and recommendations of the visiting committee are reviewed in turn by a regional committee, by the Education and Accreditation Committee and the Committee on Engineering Technology jointly and, finally, by Engineers' Council for Professional Development.

8. Published lists of curriculums include only those that have been accredited. No information is divulged as to curriculums which have been submitted for evaluation and not accredited or as to those which have not been submitted.

9. Published lists of accredited curriculums state the name of the institution and the name of the curriculum accredited.

10. Accreditation of a curriculum is granted for a limited period, usually from three to five years, with reappraisal stipulated at the end of the period. Accreditation is based on conditions as they exist at the time of evaluation and is granted only when conditions are considered as currently meeting minimum over-all requirements. If for any reason the future appears precarious, or definite weaknesses exist which should be strengthened, the accreditation will be granted for a shorter period (one to three years). Such precarious conditions include uncertainty as to financial status, uncertainty due to nature of administrative organization, need for additions to or improvements in staff or equipment, a new or changing curriculum, and undue dependence on a single individual.

11. The following statements are the only ones approved by ECPD for use in any public announcement when mention of accreditation is made:

   "An ECPD accredited Engineering Technology curriculum (program)"
   "An ECPD accredited Engineering Technician curriculum (program)"

   If accreditation is withdrawn, the institution should no longer refer to the curriculum as accredited.

12. The Committee on Engineering Technology will not recommend for accreditation as a curriculum of engineering technology type any curriculum for which the claim is made that it produces qualified engineers. No curriculum will be approved for accreditation or reaccreditation unless the word *technology* is used as the final noun in the title.

13. It is the province of the Committee on Engineering Technology to recommend curriculums that lead to the Associate Degree.

Advisory Service

Incident to the accrediting program but only upon request of recognized officials of an institution, informal advice will be given on matters such as changes in educational policy, organization, curriculums, personnel, and physical facilities.

In order to maintain the accredited list on a dependable and up-to-date basis, curriculums shall be reevaluated at intervals of from three to five years. This shall be by means of a visit by a committee or by means of information collected through questionnaires, or by both, as circumstances require.

Institute for the Certification of Engineering Technicians

THE Institute for the Certification of Engineering Technicians was established by the National Society of Professional Engineers (NSPE) in 1960 as a means of giving proper recognition to qualified engineering technicians.

The Institute is an examining body only. It is not a society to which persons belong. It exists to perform the function of determining the competency of those who voluntarily apply for certification. Technicians who receive certification do not obtain membership in any grade within NSPE (which confines its membership entirely to Registered Professional Engineers). The Institute does no instructional work. It is not in the education business. The Institute does no evaluation of curriculums or institutions, since this is being done by the Engineers' Council for Professional Development, with which a strong liaison has been established.

The Institute certifies qualified technicians in three grades: junior engineering technician, engineering technician, and senior engineering technician. Qualifications for the grades include graduation from an engineering technician program accredited by the Engineers' Council for Professional Development, number of years experience in the field, and endorsement by one or more professional engineers.

The Institute is governed by an unpaid Board of Trustees consisting of four professional engineers and four senior engineering technicians. Its affairs are handled by an executive secretary, who operates under policies determined by the Board.

With certification as its only purpose, methods to improve and expedite such certification are now under way. In January 1965 the Board authorized the establishment of six regional teams to assist in the evaluation of applications for certification.

As of June 1965, a total of 4,715 applications for certification had been received by the Institute since its inception. Of these, 4,053 were certified in the following grades: junior engineering technicians, 909; engineering technicians, 2,068; and senior engineering technicians, 1,076.

During this period, a total of 60 certified technicians were upgraded. Thirty-three were upgraded from junior engineering technician to engineering technician, and 27 were upgraded from engineering technician to senior engineering technician.

The idea of certification has met with the approval of individual technicians and engineers, engineering societies, government agencies, and industrial organizations. Many believe it promises to become one of the most important developments in the field of technology that have taken place so far.

Maurice Graney is chairman of the Board of Trustees of the Institute. Frederick Cummings is vice-chairman, and Walter T. Johnson is secretary-treasurer. Headquarters of the Institute is at 2029 K Street, N.W., Washington, D. C., 20006.

Technical Institute Council and Technical Institute Division, American Society for Engineering Education

THE American Society for Engineering Education has had a vital interest in the technical-institute type of higher education for over a quarter of a century. The early interest of the Society in the field of engineering technology led to the organization of the Technical Institute Division which throughout the years has proven to be a significant factor in the development of the technical-institute type of program. In keeping with the technological explosion, education in engineering technology more recently became involved in such a broad area of activity that it no longer was possible to deal properly with academic and administrative details within the Division. The American Society for Engineering Education, therefore, established the Technical Institute Council for the purpose of dealing primarily with administrative matters and gave the Chairman of the Council the status of Vice-President of the American Society for Engineering Education.

The purposes of the Technical Institute Council are:

•To work toward the improvement of technical-institute areas of higher education and the development of a greater recognition of the value of professional accreditation;

•To bring about cooperation between engineering colleges and technical institutes in serving better the total needs for engineering education at all levels;

•To cooperate with governmental agencies in those areas where technical-institute education relates to public safety and welfare;

•To bring about better understanding and cooperation between technical institutes and engineering societies, trade and professional organizations, and industrial groups;

•To work toward the development of public understanding of technical-institute education through cooperation with schools, guidance organizations, and other informational groups;

•To act as an instrument of inquiry into matters that relate to the effective administration of technical institutes and programs in engineering technology; and

•To provide a means for dealing with all administrative problems involving technical institutes and technical-institute education.

The purposes of the Technical Institute Division are:

•To promote and develop technical-institute education as a means of preparing for careers in engineering technology;

•To deal with curriculums, teaching methods, teacher training and development, and the welfare and guidance of the student;

•To provide for the McGraw Award and the Williston Award selections and to assume the responsibility of the presentation of these awards;

•To promote individual memberships in the American Society for Engineering Education; and

•To arrange programs in the area of engineering technology of interest and value to the individual membership of the Technical Institute Division.

Among the more important activities of the Technical Institute Council and the Division are the awards dinner held each year in conjunction with the meetings of the American Society for Engineering Education. The James H. McGraw Award is made to one who has contributed in an outstanding way to technical-institute education. The Arthur S. Williston Award is given for the contribution of significant writings in the area of technical-institute education. At the annual meeting, the Technical Institute Division presents a varied program of considerable value to those who would be responsible for technical-institute curriculum development and the guidance of students in engineering technology.

The Technical Institute Council conducts studies and initiates actions having a far-reaching effect on technical-institute education. A major project currently under development is the "Goal Study" dealing with the role to be assumed by technical-institute education during the next decade. Manpower studies and surveys are important activities of the Technical Institute Council and have consistently indicated a significant increase in technical-institute enrolments, new students, and graduates. The Technical Institute Council cooperates very closely with the Engineers' Council for Professional Development, one of the major recognized accrediting agencies for programs leading to the first degree in engineering technology, in evaluation and promotional activities.

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Section 10

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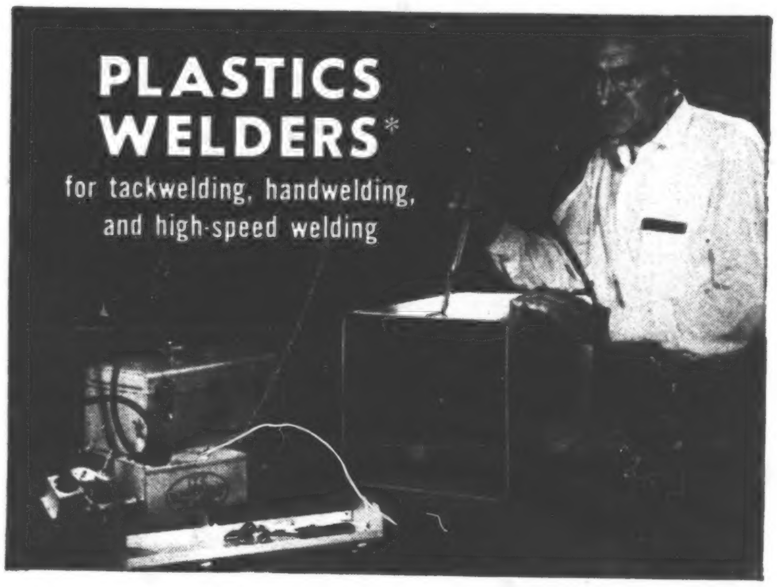

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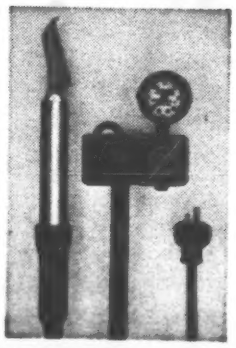

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